The Relationship Between Youth Risk-Taking Behaviour and Activity Engagement

by

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ABSTRACT

Youth have been found to engage in various risk-taking behaviours at higher rates than any other age group. However, there is a lack of research on the division between adaptive and maladaptive risk behaviours among adolescents and emerging adults. Adaptive risk-taking behaviours may present youth with ways to successfully partake in the risk behaviours that they are naturally inclined to engage in. The relationship between activity engagement and positive youth development has been extensively studied and cited as a way to expose youth to positive experiences and promote successful development. However, the relationship between activity engagement and risk behaviours among youth has yet to be studied in depth. This study investigated the potential relationship between various adaptive and maladaptive risk behaviours and activity engagement among youth, through an indirect link through five mediator variables. These potential mediators represented the three systems in Jessor's Problem Behaviour Theory. Participants included 276 youth (M = 19.06 years, SD = 1.60, 89.1% female) from Brock University. Results revealed that activity engagement significantly predicted greater adaptive social risk behaviours among youth. However, there was no mediating effect through the problem behaviour systems. Correlations revealed that being male was associated with more maladaptive risk behaviours and fewer adaptive risk behaviours than females. Additionally, behavioural engagement specifically related to less maladaptive physical health risks and psychological engagement related to greater adaptive social risks. Overall, these findings suggest that activity engagement may be differentially related to the various types of risk-taking and gender associations may exist between the various types and dimensions of risk behaviours, but future work is needed to understand the variables that may explain such relationships.

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Overview

Risk-taking is a natural part of human behaviour and it has a tendency to increase during the adolescent and emerging adult years (Steinberg, 2004). It is during this time that youth have an increased inclination toward taking risks that can put them in harm's way (Steinberg, 2004). There is a range of types of risk-taking (e.g. social, health, ethical) and with these may come varying developmental difficulties and opportunities (Jackson, Hourany & Vidmar, 1971). Beyond its multidimensionality, risk-taking can be broadly regarded as a behaviour that is normative and beneficial for youth, but maladaptive risks can lead to grave consequences. An important aspect of the research on risk-taking should be how normative adaptive risks, in all domains, can be encouraged.

In my research, I have focused on two types of risk-taking, physical and social risk, and attempted to examine the relationship between these risk behaviours and youth engagement. Engagement in activities is one aspect of youth development that may encourage adaptive risk-taking. However, the research regarding the connection between engagement and risk-taking is inadequate, as investigation into the impact that activity engagement may have on specific risk behaviour outcomes is lacking.

As a result, I have addressed the following general question in my M.A. thesis, what, if any, relationship exists between activity engagement and risk-taking behaviours. In order to answer this question I have reviewed the existing literature and conceptual models of risk-taking and engagement and also outlined the hypothesized relationships between the two. A specific mediation model of risk-taking and activity engagement has been proposed along with my hypothesis with the corresponding supporting literature. I have explained how I conceptualize engagement as relating to risk-taking, offered support for the associations that may exist, and

summarized my methods for investigation. The analyses and results that corresponded to this investigation have been thoroughly outlined and described. Finally, I have examined all results and offered interpretations of the findings, along with strengths, limitations and future directions for similar research. Overall, my research has allowed for examination of a possible manner in which adaptive risk-taking can be predicted and, in turn, how the benefits that are associated with it may be encouraged in youth.

Types of Risk-Taking

Risk-taking can be broadly defined as "behaviours that are undertaken volitionally whose outcome remain uncertain with the possibility of a negative outcome" (Igra & Irwin, 1996, p. 35). These behaviours could be either adaptive or maladaptive for the people engaging in the behaviour and the society around them (Irwin, 1990). For the purpose of my research, I have focused on two specific types of risk-taking: physical health and social risk-taking. Although the multidimensional nature of risk-taking has been identified in the literature, typically it has not been clearly studied. I have focused on two clearly defined types of risks (physical health and social) that have been previously identified; for examples of studies that have made this differentiation, please see Crews & Melnick, 1976; Evensen, 1976; Irwin & Millstein, 1986; Lee, 1975; Melnick & Wicher, 1977; Melnick & Woods, 1976; Slovic, 1966; and Steinberg, 2004.

I have defined physical health risk-taking (e.g. drunk driving) as behaviour that may impact physical and/or mental health in either the short or long-term. In this study, I have focused on physical, not mental risk-taking. Injury as a result of physical health risk behaviour has been linked to the following in Canada in 2004: 13,667 deaths, 211,768 hospitalized for treatment, 3,134,025 non-hospitalized treatment, 62,563 permanent partial disabilities, 5,023 permanent total disabilities, and $19.8 billion dollars of cost to the economy (SMARTRISK, 2009).

In addition to physical health risk-taking, I have also considered social risk-taking. I define social risk-taking as risk that entails a decision or behaviour that may impact one's social relationships, social status (e.g., popularity), and/or social skills in either the short term or long-term. An example of social risk-taking is speaking out in public against a popular opinion (Jackson et al., 1971). Social risk-taking is important due to the influence it may have on an adolescent's development in various domains. One area that it can impact is a youth's social adjustment. Specifically, youth who refuse to take any risks in social settings may become withdrawn and regard themselves as being unimportant socially (Melnick & Wicher, 1977). These youth tend to perceive themselves as less valuable to peer groups than their more socially risky peers, even though these self-reports tend to be in discrepancy with the evaluation of those around them (Melnick & Wicher, 1977; Melnick & Woods, 1976). Normative social risks should be encouraged as they may aide in positive youth development and help adolescents' functioning within groups (Melnick & Wicher, 1977).

Although I have described physical and social risks as separate, there can be overlap between them. A single behaviour can be both a physical health and social risk. For example, smoking is largely a physical health risk, but engaging in the behaviour may also impact one's social standing. In cases such as these I have classified the risk according to which category the risk fits best using pre-established risk-taking measures for validation (see Jackson et al., 1971 and Willoughby et al., 2010); for example, smoking would has been categorized as a physical health risk.

Dimensions of Risk-Taking

Not only are there different types of risk-taking, but these risks also have different dimensions. One potentially important dimension is the adaptiveness of the risk, ranging from

developmentally adaptive to maladaptive. The existence of maladaptive and adaptive risks has been discussed and defined within the literature (see Byrnes, Miller & Schafer, 1999), but typical examinations of risk-taking tends to concern only the maladaptive side of this complex behaviour. There is a trend within the literature to focus on maladaptive risks (Baumrind, 1987) and little attention is given to the encouragement of adaptive risks.

Adaptive risk-taking (also known as "good risks" or "smart risks") by definition is likely to lead to favorable outcomes for youth and allow for experimentation in a positive manner. For example, they may lead to a feeling of accomplishment upon successful completion of the activity (Baumrind, 1987; Byrnes et al., 1999 Irwin, 1987). Some examples of adaptive risks are engaging in an extreme sport with the proper training (an adaptive physical health risk) and attempting to make new friends in a new environment (an adaptive social risk). They are both risks because one cannot be sure what the outcome will be, but they are adaptive because the likelihood of gain from the behaviour is greater than the likelihood of loss. Adaptive risks are situations that allow for constructive development and open doors toward new and rewarding experiences (Eppler-Wolff & Davis, 2009). In general, engaging in adaptive risks may allow youth to learn how to think independently and examine various situations and messages (Eppler-Wolff & Davis, 2009).

Maladaptive risk-taking, by definition, is pathogenic and dangerous, with little or no chance for secondary gain (Baumrind, 1987). Some examples of maladaptive risks are smoking and going against the accepted norms of a friendship group one wishes to join. They are risks because the outcome is uncertain and they are classified as maladaptive because there is a greater likelihood of a negative outcome than a positive one. Much of the literature on risk-taking focuses on this dimension and researchers tend to refer to it simply as "risk-taking behaviour" or

"problem behaviour" (see Jessor & Jessor, 1977). Maladaptive risk-taking is usually associated with behaviours that have significant potential to jeopardize health and prosocial development (Irwin, 1987). These maladaptive risks should be discouraged and avoided (Eppler-Wolff & Davis, 2009).

Inclusion of both dimensions of risk-taking in research should be emphasized, as successful development does not concern only the avoidance of maladaptive risk behaviours, but also the successful pursuit of adaptive risk behaviours that may allow for the benefits outlined above (Byrnes et al., 1999).

In summary, *adaptive physical health risks* are behaviours in which the outcome has a greater likelihood of increasing physical health in the short or long-term than decreasing it. *Adaptive social risks* are behaviours in which the outcome has a greater likelihood of increasing social standing in one of the three identified social domains (social relationships, social status [e.g., popularity], and/or social skills) in the short or long-term than of decreasing social standing. *Maladaptive physical health risks* are behaviours in which the outcome has a greater likelihood of decreasing or jeopardizing physical health in the short or long-term than increasing it. *Maladaptive social risks* are behaviours in which the outcome has a greater likelihood of decreasing or jeopardizing one of the three identified social domains (social relationships, social status [e.g., popularity], and/or social skills) in the short or long-term than of increasing social standing.

Development of Risk-Taking

The above types of risk-taking tend to vary across development, with people at certain ages having a higher inclination towards specific types and dimensions of risks than other risk types. Increased risk-taking has been called the greatest behavioural change that occurs within

adolescence (Kelley, Schochet & Landry, 2004); it is a time marked by increased novelty seeking, risk-taking and in turn injury and mortality. This marked increase in risk-taking usually does not occur at any other time in the lifespan (Kelley et al., 2004).

The ability to judge and understand risky situations is an important skill for people to develop and it commonly increases within adolescence and emerging adulthood (Byrnes, 1998; Garon & Moore, 2004; Halpern-Felsher & Cauffman, 2001; Mann, Harmoni, & Power, 1989; Steinberg & Scott, 2003). During adolescence and early childhood, roughly between the ages of 14 years to the mid-to-late twenties, there is a shift towards reward sensitivity that may create an increase in risk-taking (Cauffman, Steinberg & Woolard, 2002). It is during this time that youth become more aware of immediate rewards for their behaviour (Steinberg, 2004). There appears to be a temporal gap from roughly the age of puberty to the early twenties, which may "impel adolescents toward thrill seeking [due to] the slow maturation of the cognitive-control system, which regulates these impulses" (Steinberg, 2007, p. 55). This vulnerability toward engaging in risk is a persistent influence on behaviour (Slovic, 1966).

There are several trends concerning youth physical health risk-taking that have been shown to reflect gender effects. Adolescent males tend to engage in maladaptive physical health risk-taking behaviours more than females and sustain more injuries (Coppens & Gentry, 1991; Ginsburg & Miller, 1982; Rosen & Peterson, 1990). This finding has been attributed to gender differences in socialization patterns (Block, 1983; Morrongiello & Dawber, 1999), varying beliefs about injury vulnerability (Morrongiello & Dawber, 1999), and differences in risk appraisals (Hillier & Morrongiello, 1998).

Overall, the literature indicates that risk-taking is a natural and unavoidable aspect of adolescence (Baumrind, 1987). However, maladaptive risks carry with them grave potential

consequences, as discussed above, and are not developmentally adaptive behaviours. In contrast, adaptive risks may allow for constructive youth development and present the benefits that exploratory risks may provide, such as the fulfillment of certain needs during adolescence. Some of these needs include autonomy, intimacy and mastery (Irwin & Millstein, 1986). Risk-taking in general should not be discouraged as youth are developmentally inclined to take more risks during this sensitive period; instead adaptive risks should be encouraged.

Models of Risk-Taking

There have been several theoretical models associated with the development of risk-taking (see Bartlett, Holditch-Davis & Belyea, 2005; Baumrind, 1987; Igra & Irwin, 1996; Irwin, 1987), each with varying conceptualizations of the behaviour. One of the most commonly cited models is Jessor and Jessor's (1977) theoretical model specific to the development of problem risk-taking in adolescence and emerging adulthood, entitled "Problem Behavior Theory" (PBT). This theory presents a clear and measurable framework in which risk-taking can be conceptualized. The basic premise is that three groups or systems of variables together function as risk or protective factors for risk-taking. The behaviour system represents pre-existing conventional behaviours, both negative and positive. An example of this system is one's current academic performance. The perceived environment system represents personal context and the variables that one perceives to be close to one's environment; this includes both proximal (e.g., peer modeling of behaviour) and distal (e.g., family support) sources of influence. An example of an influence within this system is the peer role models that a youth holds. The personality system represents varying values, beliefs, attitudes, opinions, and social orientations. An example of this system is the value that one places on social relationships. For the purpose of my thesis, I

have focused on only one variable within each system. However, it is important to note that each system contains numerous variables that may contribute to risk-taking behaviours.

These three aforementioned systems may have a combined relationship with adolescents' risk-taking behaviours. Within each of the three systems there are variables from a youth's life that serve as either risk or protective factors for problem behaviour. It is the balance between these variables that aids in determining the amount of maladaptive risk-taking in which a person will engage (Jessor, 1991; Jessor, Donovan & Costa, 1991). Using this theory for my thesis allowed for a view of youth risk-taking that encompassed various aspects of a youth's life and incorporated a range of social, environmental and biological influences. Problem risk-taking behaviour is not viewed as an isolated behaviour, but rather is seen as depending on and depicting other aspects of personality, life choices, and environmental factors (Jessor & Jessor, 1977).

Jessor's work specifically focused on problem behaviours, but PBT may be applied to both maladaptive and adaptive risk-taking. For the purpose of my thesis, I have expanded Jessor's model to include both dimensions of risk behaviour. This modified model is referred to as "Risk-Taking Behaviour Theory" (RBT). The general premise of this theory is that characteristics within adolescents' behaviour, perceived environment, and personality systems relate to their risk-taking behaviour, including the type and dimension of risks. The three characteristics I have selected to represent each system are academic performance (behaviour system), positive peer role models (perceived environment system) and value on social relationships (personality system). Contexts that may influence these variables may then have an indirect impact on the resulting risk-taking, with the three systems acting as mediators (see Figure 1).

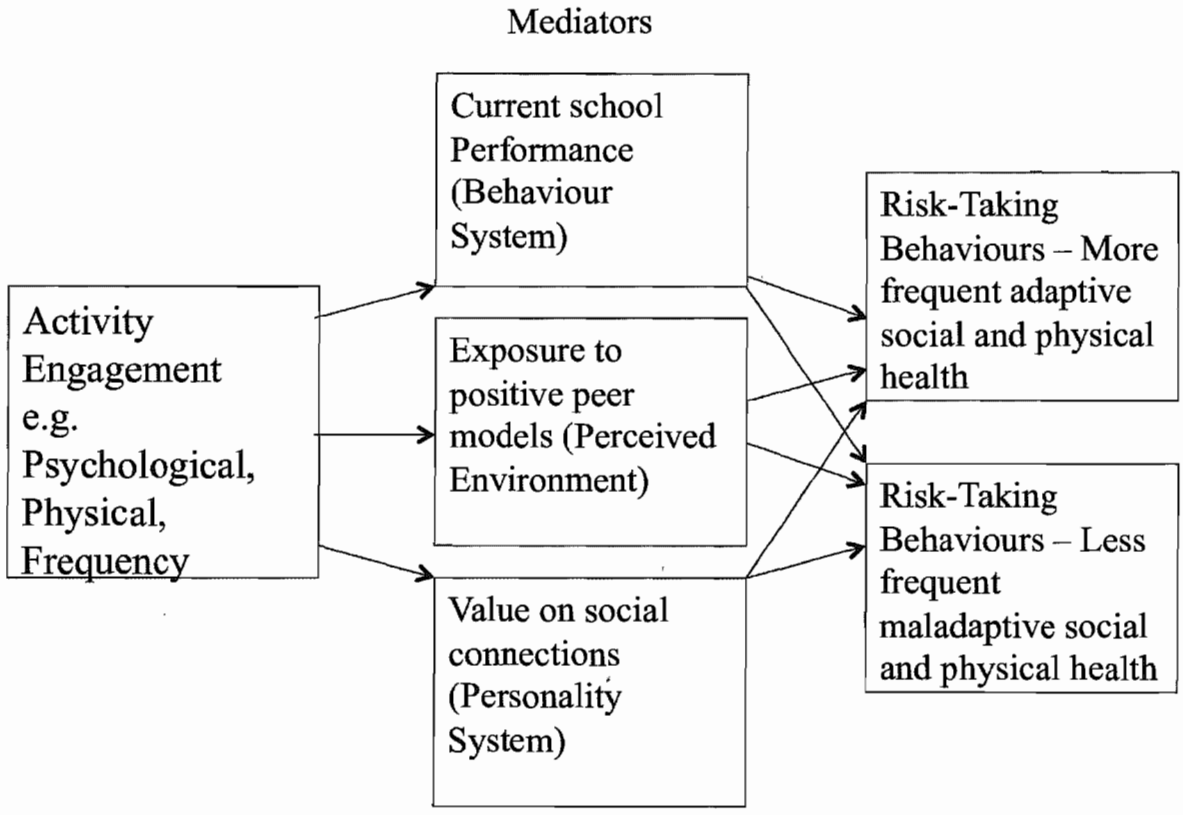

Figure 1: Risk-Taking behaviour mediation model

Links Between Engagement and Risk-Taking

Various contexts could prove to be influential within RBT; for the purpose of my thesis I have proposed that engagement activities may be one such significant context. Engagement has been defined as "the meaningful and sustained participation in an activity with a focus outside the self" (Pancer, Rose-Krasnor, & Loiselle, 2002, p. 2). Engagement may be conceptualized as having four main dimensions: (a) a cognitive component, which represents knowledge of the activity and cognitions stimulated through it; (b) an affective component, which concerns the emotional and internal reactions that arise from participation; (c) a behavioural component, which represents any "hands on" involvement; and (d) a spiritual component, which represents a connection to something beyond the self (Rose-Krasnor, 2009). Additionally, activities can be

distinguished in terms of being either psychological or behavioural. Psychological engagement occurs when an involved youth regards the activity as having relevance to the self and is more of an internal process, whereas behavioural engagement occurs with physical participation in an activity (Rose-Krasnor, 2009). Psychological and behavioural engagement each represent distinct but often related categories of involvement (Rose-Krasnor, 2009).

Research has demonstrated that there may be a relationship between various engagement activities and risk-taking behaviours. For example, Murphey, Lamonda, Carney, and Duncan (2004) conducted a cross-sectional study on maladaptive physical health risks. They found that being exposed to developmental assets, such as partaking in after-school activities (both behavioural and psychological involvement), predicted fewer maladaptive physical health behaviours and greater health planning behaviours in 12-18 year olds. Additionally, some studies have shown a relationship between behavioural engagement and lower drug and alcohol use (e.g., Zill, Nord & Loomis, 1995). However, these results are mixed, with some research demonstrating that sport involvement, in particular, may lead to higher use of drugs and alcohol (Feldman & Matjasko, 2005). In terms of social risk-taking, Morrissey and Werner-Wilson (2005), in a cross-sectional study, found that prosocial behaviours, attitudes and actions (adaptive social risks) predicted behavioural or psychological activity involvement for 16-20 year olds.

Engagement in activities that specifically utilize risky settings and risk-taking have been related to positive youth development. An example of this is the Outward Bound program, which places youth in situations where taking risks in a controlled setting (e.g. wilderness camping), paying attention to leaders, working as a team, and becoming engaged is vital for subsequent survival and success (Hattie, Marsh, Neill, & Richards, 1997; Neill & Dias, 2001). This type of engagement may foster short-term gains, which then may be followed by substantial long-term

successes. Some gains include increased grades, leadership skills, and the tendency to seek out advice and partake in consultative leadership (Hattie et al., 1997; Neill & Dias, 2001). There have been observed increases in emotional control, understanding, resiliency, self-esteem and self-concept. Links also have been made to decreased aggression (Hattie et al., 1997; Neill & Dias, 2001). It is important to note that the populations who join such engagement programs may not be "typical" youth, so these results may not generalize to all adolescents.

Mechanisms for Engagement

The reason for the successful outcomes in these risk-based engagement activities is unknown, but has been speculated upon. The emphasis these programs place on the immediate quality of experience and interconnectedness of all aspects of the program could be what leads to gains (Hattie et al., 1997). Additionally, these programs set difficult goals that are specifically structured for success, which could aide in positive youth development. Also, the feedback within the engagement is directly related to future activities and, in turn emphasizes the necessity of listening to role models and thinking ahead. Finally, these programs encourage a constant reassessment of working and cognitive strategies, which could teach youth to be vigilant in their choices (Hattie et al., 1997). These programs do not always correspond to all engagement activities, and there is a lack of scholarly research on the relationship between other various engagement activities and risk-taking outcomes.

Other general forms of engagement (e.g., sports, school clubs) can foster positive youth development (Rose-Krasnor, 2009) and there are various mechanisms for this. One important predictor of success in engagement is parental involvement and monitoring, with higher levels of parental input predicting success in the activity and in turn positive development (Feldman & Matjasko, 2005). Age, gender and socioeconomic status have also been associated with outcomes

of engagement (Feldman & Matjasko, 2005). These variables are "thought to influence patterns of participation" (Feldman & Matjasko, 2005, pp. 198) and may mediate the successes that youth achieve in engagement activities (Feldman & Matjasko, 2005). Grades may also influence success in engagement, as some schools and parents only allow children to participate in activities if they maintain a certain average (Feldman & Matjasko, 2005).

These successes in activity engagement have been related to positive youth development. Mechanisms suggested for why engagement may "work" to promote development have been developing planning skills, self-confidence, extra-familial support, and exposure to positive social models (Feldman & Matjasko, 2005; Rose-Krasnor, 2009). These developments have been attributed to successful experiences in activity engagement and the positive learning and socializing that occurs within the activities (Feldman & Matjasko, 2005; Rose-Krasnor, 2009). Overall, there are various mechanisms within activity engagement that can create success for youth, but how these successes may relate to risk-taking behaviours were found to require a more in-depth investigation.

The Present Study and Overall Research Question

As is evident in the literature cited above, there is considerable support for a potential relationship between engagement and risk-taking. Youth engagement in general can be a facilitator of positive youth development, but how it relates to risk-taking behaviours requires more research. It is this gap within the literature that led to the overall research question for my M.A. thesis: Is there a relationship between youth risk-taking behaviour and engagement (activity involvement) and what might it look like? Research has demonstrated that Jessor's model (Jessor & Jessor, 1977) may be used to describe and explain risk-taking decisions/behaviours among youth, and this was the context in which I examined the potential relations among risk-taking,

activity engagement, and selected elements of the RBT. I have tested a model in which the three RBT systems (behaviour, perceived environment and personality systems) acted as mediators between activity engagement and outcome risk-taking (see Figure 1).

I have hypothesized that the psychological and behavioural aspects of activity engagement would have positive relationships with the characteristics selected to represent each of the three RBT systems (i.e., academic performance, positive peer role models and value placed on social relationships). In turn, higher scores in these potential mediating variables have been expected to be positively related to adaptive risk-taking behaviours and negatively related to maladaptive risk-taking behaviours. The relationships between the RBT characteristics, engagement and risk-taking are outlined below.

Behaviour System

The aspect of the behaviour system that I have hypothesized may relate to activity engagement is current school performance. The relationship between engagement and greater academic successes (Rose-Krasnor, 2009) may be associated with lower maladaptive risk-taking and greater adaptive risk-taking due to the creation of new foci, such as academic accomplishments, that one would not want to jeopardize. Hypothetically youth would then turn to adaptive risks in order to both fulfill the need for risk behaviours during adolescence and while not endangering their academic successes.

Activity Engagement, Academic Performance and Risk-Taking

Psychological and behavioural activity engagement have been related to higher academic achievement in youth (see Feldman & Matjasko, 2005; Morrissey & Werner-Wilson, 2005, Broh, 2002; Eccles, Barber, Stone, & Hunt, 2003). Activities may provide an environment in which youth can develop skills that can help them in academics (e.g., organizational abilities) (Feldman

& Matjasko, 2005). Additionally, the activities may provide settings for youth in which their extracurricular activities can be linked to their school environment (Finn, 1989). For some youth, activity engagement may provide a setting in which school achievements are recognized and encouraged (Feldman & Matjasko, 2005). Zaff and colleagues (2003) found that continued activity engagement (both psychological and behavioural) from 8th through 12th grade was significantly related to academic achievement in college. Behavioural engagement in sports activities has been related to higher grades and a desire to succeed among female athletes (Eccles et al., 1999). Broh (2002) found a relationship between sport involvement and positive academic outcomes for male athletes. There is a relationship between engagement and higher academic performance and these successes may predict outcome risk behaviours.

Increased academic success has been found to be one of the strongest predictors of risk-taking, with lower school performance and expectations relating to greater maladaptive risks and higher performance positively relating to adaptive risk behaviours (Jessor et al. 1991). Similarly, school failure has been strongly related to higher maladaptive risk-taking behaviours (Hawkins, Catalano & Miller, 1992). School success has been indentified as a protective factor against maladaptive risk behaviours and a solicitor of adaptive behaviours in youth (Hawkins et al., 1992). Poor school performance may place youth on a trajectory toward higher maladaptive behaviours by exposing them to peers who condone maladaptive risks (Ary et al., 1999). Evans and colleagues (1995) found that youth who judged their academic performance to be above average were less likely to engage in maladaptive physical health risks and more likely to take health precautions than youth who judged their academic performance as below average. Further, Dishion, Patterson, Stoolmiller and Skinner (1991) found that greater involvement in maladaptive risk-taking was related to lower academic success in boys. Overall, increases in

academic achievement may predict adaptive risks, and lower academic performance may be associated with maladaptive risks. I have hypothesized that activity engagement will be related positively to academic successes in youth and, in turn, may predict greater adaptive risks and lower maladaptive risk behaviours.

Perceived Environment System

The aspect of the perceived environment system that I have hypothesized may be impacted by activity engagement and aid in predicting outcome risk-taking is perceived positive peer role models and peers who do not engage in maladaptive risk-taking behaviours. Exposure to positive peer models, who avoid maladaptive risks, within activities may encourage youth to listen to these positive peer role models regarding their risk decisions (Rose-Krasnor, 2009) . Hypothetically, these interactions may function as protective factors against maladaptive risks and serve to promote adaptive risk-taking (Jessor & Jessor, 1977; Jessor, 1991; Jessor et al., 1991).

Activity Engagement, Positive Peer Role Models and Risk-Taking

Activity engagement has been related to exposure to positive peer role models (Rose-Krasnor, 2009). It can provide youth with an environment in which they are exposed to positive adult and peer models for behaviour (Feldman & Matjasko, 2005). These models may encourage adaptive decisions about risk behaviours, function as positive reinforcers and act as deterrents against maladaptive behaviours (Reis & Diaz, 1999). Reis and Diaz (1999) found that psychological extracurricular activities may help youth to develop positive and supportive networks of both peers and adults. The positive peer role models were found to be persistent influences on behaviour and influential in the adolescents' future successes and decisions (Ries & Diaz, 1999). For some youth, engagement can create adaptive behaviour models who may

encourage success and adaptive life decisions (Ries & Diaz, 1999). There is a relationship between engagement and exposure to positive peer role models and this peer influence may relate to outcome risk behaviours.

Positive role models have been related to greater adaptive risks and negative role models positively relating to maladaptive risk-taking (Jessor et al., 1991). Peer models of behaviour are one of the strongest predictors of outcome risk-taking (Gardner & Steinberg, 2005). Peer role models provide youth with norms regarding which behaviours are acceptable (Jessor & Jessor, 1977; Jessor, 1991; Jessor et al., 1991). Reininger and colleagues (2005) found that perceived peer role model acceptance of and engagement in risk-taking behaviours was a strong predictor of risk-taking behaviours. Perceived peer value and acceptance of adaptive risks influenced youth to engage in adaptive risks, whereas perceived value and acceptance of maladaptive risks predicted negative behaviours (Reininger et al., 2005). A study conducted by Ary and colleagues (1999) found that negative peer models can be one of the strongest predictors of maladaptive risk decisions. For example, Prinstein, Boergers and Spirito (2001) found that youth who engaged in maladaptive risks were more likely to have peer role models who engaged in and accepted similar behaviours. Youth who avoided maladaptive risks were likely to have peer role models who endorsed adaptive behaviours. Overall, perceived peer role models relate to risk-taking decisions, with negative models promoting maladaptive risk behaviours and positive models supporting adaptive risk behaviours. Therefore, I have hypothesized that engagement will be associated positively with positive peer role models, who do not engage in maladaptive risk-taking, and in turn this will demonstrate an indirect relationship with risk-taking behaviours through promoting adaptive risk decisions and discouraging maladaptive risk decisions.

Personality System

The aspect of the personality system that I have hypothesized will be related to both outcome risk-taking and activity engagement is perceived value for social connections. Activity engagement may create competencies in social development and perceptions of importance toward social connections generated through the activity involvement (Rose-Krasnor, 2009). In turn, this may serve as a protective factor against maladaptive social risk-taking (Jessor & Jessor, 1977; Jessor, 1991; Jessor et al., 1991), as youth would likely not want to jeopardize the positive connections they have made. Hypothetically, youth would want to engage in adaptive risks in order to protect the social relationships that they value.

Activity Engagement, Valuing Social Relationships and Risk-Taking

Activity engagement has been associated with feelings of value toward social connections (Rose-Krasnor, 2009). It can allow youth to develop social capital and encourage them to value their social relationships (Feldman & Matjasko, 2005). For example, Morrissey and Werner-Wilson (2005) found that, for a sample of 5th to 12th grade students, behavioural and psychological activity involvement was related positive feelings and value toward social groups. Engagement also can provide youth with opportunities to develop important social relations and a value for the contribution that these make to their lives (Feldman & Matjasko, 2005). The social networks generated through engagement have been found to become important for adolescents and can influence their decisions (Feldman & Matjasko, 2005). Indeed, youth tend to value the relationships that they develop in engagement contexts and may, in turn, alter their behaviour to ensure that their social networks remain intact (Feldman & Matjasko, 2005). There appears to be a relationship between engagement and values placed on social connections and this may relate to outcome risk behaviours.

Increased value for social relationships has been found to be a predictor of adaptive risk decisions and strong values toward independence have been related to increased maladaptive risk-decisions (Jessor et al., 1991). Brook, Whiteman, Gordon, and Brook (1988) noted that childhood isolation and low value toward social relations was a strong predictor of maladaptive risk behaviours. Similarly, Shedler and Block (1990) found that high degrees of social alienation were also associated with maladaptive risk-taking. Conversely, high value toward social relations has been found to serve as a potential protective factor toward maladaptive risks and may encourage adaptive risks and pro-social behaviour (Jessor et al., 1991). Youth generally do not want to endanger social relationships that they value and, in turn, may act in ways to protect them (Jessor et al., 1991).

Overall, perceived value in social relations may encourage adaptive risks and discourage maladaptive behaviours that may endanger valued relationships. I have hypothesized that engagement will be positively associated with these valued social relationships and in turn will predict adaptive risk-taking and discourage maladaptive risks.

Summary

I have hypothesized that activity engagement will demonstrate a significant direct relationship to each of the four risk-taking categories. Specifically I have hypothesized that activity engagement will be positively associated with adaptive risk-taking and negatively associated with maladaptive risk-taking. I have also hypothesized that that activity engagement would demonstrate significant associations with each of the three RBT mediator systems. Finally, I have hypothesized that the variables selected to represent the three mediator systems would then be significantly positively related to adaptive risk-taking behaviours and negatively related to

maladaptive risk-taking behaviours; demonstrating significant indirect relationships between the RBT mediator variables and outcome risk-taking.

Method

Participants

Participants included 276 students[1] (30 males, 246 females) from Brock University's undergraduate population. Students had a mean age of 19.06 years (SD = 1.60, range 18 – 25). The demographic characteristics of the participants are listed in Table 1. Participants were asked to fill out all measures through an online survey (using a service called Survey Monkey). For their participation, students chose to either receive "research credits" that could be applied toward their final grade in the course or participate in a $100 draw (11.2% of participants participated in the lottery and 88.8% participated in for research credits).

[1] The original sample size was 354, however 67 of these participants stopped after the portion of the online survey asking them for their informed consent and were removed from the dataset. This immediate dropout rate was either due to participants forgetting to print off their consent page and logging back onto the survey to do so or from participants simply logging in to get their credit without even attempting the survey (no identifying information was collected, so the participants knew they would still receive credit even without filling out any information). Eleven more participants stopped after the first page of demographic information and were also removed from the dataset. Any participants who continued on past the first page of demographic information, even if they stopped soon after, where kept in the dataset in order to maintain a representative sample.

It has been found that 10% of participants should be expected to dropout of online surveys immediately or after completing the first page of questions. It is thought that this attrition rate is due to the fact that participants know they can still get their credit/reward without having to actually complete the survey. Such dropouts have not been found to be systematically different from the rest of the sample, thus can be safely removed (Hoerger, 2010).

Table 1. *Participant Demographic Characteristics*

Variables	*N*	Percentage
Participant gender		
Males	30	10.9
Females	244	89.1
Missing	2	0.7
Participant faculty		
Applied Health Sciences	46	16.7
Education	12	4.3
Humanities	23	8.3
Mathematics and Sciences	18	6.5
Social Sciences	137	49.6
Undeclared	10	3.6
Other	30	10.9
Participant ethnicity		
Caucasian	167	60.5
Asian	10	3.6
Eastern European	43	15.6
Other	46	16.7
Missing	10	3.6
Parent education (highest level)		
Mother education		
Did not finish high school	12	4.3
Finished high school	71	25.7
Some college or university	40	14.5
Finished university or college	124	44.9
Graduate school	22	8
Missing	7	2.6
Father education		
Did not finish high school	15	5.4
Finished high school	79	28.6
Some college or university	35	12.7
Finished university or college	103	37.3
Graduate school	32	11.6
Missing	12	4.3

N = 276

Procedure

Active informed consent was obtained from all of the participants. This procedure was reviewed and received clearance by the Brock University Research Ethics Board (file number 10-150, see Appendix A for REB clearance). The participants were informed that throughout the testing they could terminate their participation at any time without penalty. All responses have been kept completely anonymous, confidential and in a secure environment. Additionally, all participants were be provided with a debriefing upon completion of the study.

Measures

See Table 2 for a list of variables, composites and their conceptual and operational definitions.

Demographics

Demographics were obtained through asking the participants their age, gender, ethnic group, parental education (a proxy of socioeconomic status), and major of study. Gender was coded so that higher scores indicated males (0 = female, 1 = male).

Table 2. *Construct/Variable List*

Construct/Variable	Conceptual Definition	Operational Definition (measure)
Adaptive Physical Health Risk-Taking	A behaviour in which the outcome has a greater likelihood of increasing physical health in the short or long-term than decreasing it.	Modified version of the Willoughby Risk-Taking Inventory (RTI-M) (2010) Part A Items: 7, 16, 23, 32, 33, 36, 38, 39, and 41
Maladaptive Physical Health Risk-Taking	A behaviour in which the outcome has a greater likelihood of decreasing or jeopardizing physical health in the short or long-term than increasing it.	Modified version of the Willoughby Risk-Taking Inventory (2010) Part A Items: 4, 5, 6, 12, 13, 24, 31, 34, 37, and 40
Adaptive Social Risk-Taking	A behaviour in which the outcome has a greater likelihood of increasing social standing in one of the three identified social domains (social relationships, social status [e.g., popularity], and/or social skills) in the short or long-term than decreasing social standing.	Modified version of the Willoughby Risk-Taking Inventory (2010) Part A Items: 2, 10, 17, 19, 20, 21, 22, 25, 26, 28, 29, and 30
Maladaptive Social Risk-Taking	A behaviour in which the outcome has a greater likelihood of decreasing social standing in one of the three social domains in the short or long-term than increasing it.	Modified version of the Willoughby Risk-Taking Inventory (2010) Part A Items: 1, 3, 8, 9, 11, 14, 15, 18, 27, and 30
Engagement	Meaningful and sustained participation in an activity outside the self; made of psychological engagement and behavioural engagement (Pancer, Rose-Krasnor, & Loiselle, 2002).	Modified version of the Snap-Shot Survey (The "Portrait survey") (Busseri, Rose-Krasnor, & the Centre of Excellence for Youth Engagement, 2009). Psychological Engagement: 3 items for head, 3 items for heart and 4 items for spirit Behavioural Engagement: 3 items for feet
Personality System	Individuals' varying values, beliefs, attitudes, opinions, and social orientations. The aspect of this system hat I hypothesize will impact risk-taking behaviours is perceived value on close social connections.	1) Modified version of section two of the Harter-SPPA ("How important are each of these things to you" subscale). Items: 8 and 16 2) SIS (Crandall, 1991). Items: 2, 3, 5, 7, 9, 11, 12, 14, 15, 18, 19, 20, 21, and 23*
Perceived Environment System	Individuals' personal context and the variables that they perceive to be close to their environment. The aspect of this system hat I hypothesize will impact risk-taking behaviours is exposure to positive peer models of behaviour.	The perceived environment system subsection of the Young Adult Questionnaire (see Donovan & Jessor, 1978, 1985; Jessor, Chase & Donovan, 1980; Jessor, Donovan & Widmer, 1980). Items: 9, 10, 11, 12, 13, 14, and 15
Behaviour System	Individuals' pre-existing conventional behaviours; both negative and positive. The aspect of this system that I hypothesize will impact risk-taking behaviours is current school performance.	1) Modified version of section one of the Harter-SPPA ("What I'm Like" subscale). Items: 1, 7, 13, 19, and 25 2) Grades
Note: *Item 22 deleted to improve reliability		

Physical Health and Social Risk-Taking

These variables were measured through an adapted version of risk behaviours assessed with the Risk-Taking Inventory (RTI), developed by Teena Willoughby and colleagues (2010). Social risk items for the RTI-Modified (RTI-M) were taken from the Jackson, Hourany and Vidmar (1971) Risk-Taking Inventory. The RTI-M yields scores regarding the frequency of participation in the risk behaviours. The inventory is separated into three sections; two addressing risk behaviours in the last 12 months and one focusing on risk frequencies that best describe the participant. The total number of items on the adapted scale is 48. Only responses from the first section were used to create composite scores for each type and dimension of risk-taking. Responses for the second and third section were recorded, but not used within the current study. (See Appendix B for the adapted measure)

In the first section, participants read 41 different risk behaviours and respond about their frequency of participating in them within the last 12 months. The scales have four possible choices ranging from "never" to "often". A sample item is how often in the last 12 months have the participants "Operated a vehicle while impaired (buzzed/drunk; high)". There was no problem with missing data for the composite scores. For each of the risk-taking composites created from this section I have found internal consistencies between .72 and .74. (See Table 3 for a list of all internal consistencies, which are reported based on only the items included in the composite variables).

The second section asks participants the frequency with which they have used three different substances within the last 12 months. The scales have six possible choices, ranging from, either "never" to "every day". A sample item has participants rate their frequency using

"hash, marijuana (weed, joint)". There is also a follow-up question asking the participants to list any other drugs they have used.

The third section asks participants to read four questions about how often they engage in various risk behaviours. The response scales vary for each question and generally capture how often, if ever, they engage in the described behaviours A sample question is "On average, when you are drinking alcohol, about how many drinks do you have?" and requires that the participant respond on a scale ranging from less than one to over 10.

Engagement Dimensions

These variables were measured through a modified version of the Snapshot Survey (Busseri, Rose-Krasnor, & the Centre of Excellence for Youth Engagement, 2009). This inventory is designed to measure both the psychological and behavioural aspects of engagement in either a preselected activity or one chosen by the participant. The measure can be used to obtain one aggregated psychological engagement score, as well as the frequency of engagement. The inventory is separated into two parts, the Portrait and Landscape Surveys, which measure different aspects of individual engagement. For the purpose of my thesis I only used the Portrait survey. The survey was focused on an activity involvement that the participant identified as fitting the provided definition of engagement (meaningful and sustained participation in an activity outside the self). (See Appendix C for the modified scale)

The Portrait Survey asks participants to read 16 questions about their personal engagement experience and respond to them on the scales provided. Additionally, participants are asked to write down what they do in their activity. There are three items each for the feet, head and heart aspects of engagement and four for the spirit section. The feet items will provide a score for behavioural engagement and the combined head, heart and spirit items will provide

the psychological engagement score. The scales for the head, heart and spirit aspects have five possible choices ranging from "not at all" to "a lot". A sample item from the heart section asks the participant to rate the statement "This activity is an important part of who I am". The scales for the feet (behavioural) aspect provide information on frequency and duration of activity involvement, I have used the frequency of engagement as the measure of behavioural engagement. There was no problem with missing data for the composite engagement scores. I found a high internal consistency for psychological engagement ($\alpha = .87$) and a low, but acceptable, internal consistency for behavioural engagement ($\alpha = .50$). A hypothetical reason for the low internal consistency for behavioural engagement may be due to the lax restrictions on the type of engagement activities that participants were able to report on. Had the study restricted responses to only specific types of engagement I may have found more consistent scores on the frequency of engagement.

Potential Mediators

Academic Performance (Behaviour System)

Academic performance was measured using a modified scholastic subscale of the Harter Self-Perception Profile for Adolescents (Harter-SPPA) (Harter, 1988). This inventory is entitled "What I'm Like" and has 30 items. Each item on the scale contain two statements about youth and asks participants to rate which is like them and then how much it is like them ("really true for me" or "sort of true for me"). Scholastic competence is ascertained through five items on the first section. A sample item is "some young adults are pretty slow in finishing school work" or "other young adults can do school work more quickly" (Harter, 1988). This scale was modified to be fit for young adults, instead of teenagers, by changing the wording from adolescents to young adults. (See Appendix C for the modified measure)

The internal consistency of the SPPA has been found to range between 0.74 to 0.92 (Saigal, Lambert, Russ, & Hoult, 2002). I found an internal consistency of .71 in the present study.

Value on Social Relationships (Personality System)

Social value was measured using a modified importance subscale of the Harter-SPPA (Harter, 1988). This inventory is entitled "How important are each of these things to you?" and has 16 items. Perceived value on social connections is obtained through two items in the second section of the questionnaire. A sample item is "some youth think it's important to be able to make really close friends" or "other youth don't think making close friends is all that important". (See Appendix D for the modified measure)

The internal consistency of the SPPA has been found to range between 0.74 to 0.92 (Saigal, Lambert, Russ, & Hoult, 2002).). I found an internal consistency of .64 in the present study.

A second measure of social value was obtained using the Social Interest Scale (Crandall, 1991). The measure requires participants to read 24 pairs of personal characteristics or traits and underline within each pair the trait they value more highly. There are 15 key pairs and nine buffer pairs within this scale. A sample item asks participants if they would rather be trustworthy or wise. An answer of trustworthy is indicative of higher value toward social interests (Crandall, 1991). (See Appendix E for the measure)

The internal consistency of this scale has been found to be high (e.g., Crandall at .82, 1991).). I found an internal consistency of .66 in the present study.

Positive Peer Role Models (Perceived Environment System)

Influence of peer role models was measured using the perceived environment system section of a modified version of Jessor's Young Adult Questionnaire (see Donovan & Jessor, 1978; Jessor, Chase & Donovan, 1980; Jessor, Donovan & Widmer, 1980). This inventory is designed to measure the perceived social approval/influence of peers on problem behaviours (Jessor et al., 1991) and was modified to include health and social risks (Jackson et al., 1971). It contains seven sections of questions, but only the following six sections were included in the survey; parent vs. friends' influence, friends' approval of problem behaviour (risk-taking), value of parents versus friends opinions, impact of parents versus friends, friends influence on risk-taking behaviours, and friends frequency of engagement in risk-taking behaviours (for the purpose of my thesis only the questions concerning friends frequency of engagement in risk-taking behaviours were used to create the composite for positive peers) (Jessor et al., 1991). (See Appendix F for the modified measure)

This inventory contains a total of 14 items requiring participants to respond to statements about influences in their environment. The first five items ask about who the participant feels is most influential in their decisions. A sample item is "Who has a greater impact on your present outlook on life (parents or friends)?" The next three ask about perceived peer acceptance of behaviours. A sample item is "How often do your friends influence you to engage in deviant behaviour?". The final six items concern friends frequency of engagement in risk-taking behaviours. A sample items is "How often do your friends act out in social settings?", with five possible choices ranging from "Not at all" to "A lot".

The internal consistency for this measure has been found to be between .52 and .76 for college men and between .43 and .68 for college women (Jessor et al., 1991). For the composite

created from the six items concerning friends frequency of engagement in risk-taking behaviours I have found an internal consistency of .76.

Social Desirability

A measure of social desirability was obtained from the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960). This was used to assess a possible bias in risk-taking responses. This inventory requires participants to respond to 33 statements as either true (the statement describes them) or false (the statement does not describe them). A sample item is "No matter who I'm talking to, I'm always a good listener"; a response of true would indicate a tendency for social desirability (Crowne & Marlowe, 1960). (See Appendix G for the measure)

The internal consistency of this scale has been found to be high. In their original study, Crowne and Marlowe found it to be .88 (Crowne & Marlowe, 1960). I have found an internal consistency of .66.

Data Analysis

Prior to the main mediation analyses, an intensive data screening procedure was carried out. First, all variables were checked for normality through analysis of the skewness and kurtosis levels, as well as a visual examination of the corresponding histograms. The data was screened for univariate outliers, with any data points outside of |3| standard deviations being examined further and deleted if necessary. This cut-off point was selected because the values that fall within these points represent 99.87% of the scores in the distribution and it follows the general rule of thumb regarding a point to determine which participant is an outlier (Gravetter & Wallnau, 2004). The data was checked twice for any problems with missing data. First a correlation analysis was run with all of the main variables, using listwise deletion in order to obtain the sample size when all participants missing any data were eliminated. If the amount of

missing participants represented more than 5% of the sample, then it was taken that there was a problem with missing data. Additionally, a Missing Values Analysis was conducted and again if less than 5% is missing on all variables, then it was taken that there was no problem with missing data (Gravetter & Wallnau, 2004). Residuals were also investigated in order to asses if the models met the underlying assumptions of normality, homoscedasticity and model specificity.

Several variables were considered as potential covariates, including gender, age, parental education (a proxy of socioeconomic status) and social desirability (note; gender was originally considered as a potential interaction term; however, due to the fact that the study sample was predominantly female, (89.1%) of the sample was female, there was not enough variability in gender to do so). Gender, age and parental education were investigated as potential covariates as literature has shown that each of these variables may impact youth risk-taking (Boyer, 2006). Social desirability was examined to check for a possible social desirability bias in responses. A social desirability bias has been found to exist for responses to risk-taking (see Kogan, 1964; Kogan & Wallach, 1967). The correlations between all variables and potential covariates were investigated and if strong relationships were found between any of these variables and risk-taking, activity engagement and/or the variables selected to represent the systems in RBT, these variables were included as covariates and partialled out during the primary analyses through including them on the first step of each regression model. In turn, the mediator and independent variables were entered on the subsequent steps, beginning with step two and these analyses are described below.

Mediation Model

To test the hypotheses that the variables selected to represent RBT would partially mediate the effect of activity engagement on youth risk-taking behaviours, the method

established by Baron and Kenny (1986) to test for mediation was followed. It is important to note that this analysis was run four separate times, once predicting adaptive physical health risk-taking, a second time predicting maladaptive physical health risk-taking, a third time predicting adaptive social risk-taking and a fourth time predicting maladaptive social risk-taking. After the covariates had been entered on the first step, the second step of the mediation regression was used to establish the existence of a significant direct relationship between activity engagement and risk-taking. The third step was to determine if there was a significant direct relationship between activity engagement and the mediator variables selected to represent RBT. The fourth step was used to determine if there was a significant indirect relationship between the mediator variables and risk-taking, this significant relationship was to be shown with activity engagement included as a simultaneous predictor. This final step of the regression was used to examine if the relationship between activity engagement and risk-taking was reduced upon addition of the mediator RBT variables. [2]

In order to establish partial mediation during this analysis, it was required that the effect of activity engagement on risk-taking, while controlling for the RBT mediator variables, needed to be significantly smaller than the direct effect of activity engagement on risk-taking demonstrated in the second step (Baron & Kenny, 1986). In order to assess if the mediation effects were significant, bootstrapping analyses were used.

Bootstrapping involves taking a large number of samples of a specific size (in this study it was 10,000 samples of $N = 276$) from the raw data and sampling with replacement in order to estimate the significance of the indirect effect and standard error. Using the samples, the

[2] There were multiple ways in which this model could have been theoretically conceptualized (e.g., risk-taking to the RBT mediator variables to activity engagement). However, the main models were analyzed with several other plausible mediation models and it was noted that no other model proved to be as empirically sound as the main model that has been presented.

bootstrapping macro makes a new sampling distribution for the indirect effect and provides the upper and lower values of the 95% confidence interval (i.e., the 2.5th and 97.5th percentiles of the new resampled distribution) (McCartney, Burchinal & Bub, 2006; Preacher & Hayes, 2004; Preacher & Hayes 2008). In order to determine if the indirect effect is significantly different from zero at the desired *p* level (i.e., to reject the null hypothesis that there was no mediation), the bootstrapping results must show that the indirect effect is different from zero and that the 95% confidence intervals do not cover zero. Bootstrapping has been recommended as the proper method to establish significance of the indirect effect, especially with smaller samples, as this method provides statistically sound results and does not impose any distributional assumptions (McCartney et al. 2006; Preacher & Hayes, 2004; Preacher & Hayes 2008).

There has been criticism within the literature regarding which statistical procedures should be used to establish significance of a mediated effect (e.g., MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; MacKinnon, Lockwood & Williams, 2004; MacKinnon, Fairchild & Frtiz, 2007; McCartney et al., 2006; Preacher & Hayes, 2004). The Sobel test has been especially criticized, as this test relies on the assumption of normality. However, as recent researchers have shown, the distribution of indirect effects tends to not follow a normal distribution and is typically asymmetric (positively skewed and highly kurtotic). Thus, the Sobel test has low statistical power to detect mediation, especially in situations with smaller sample sizes (i.e. $N < 400$). Using bootstrapping to estimate the significance of a mediated effect is an approach that does not make any assumptions about the normality of the distributions. It has been recommended by various experts in the field to only conduct a Sobel test if the sample is large enough (Preacher & Hayes, 2004; Preacher et al., 2007).

Following the procedures outlined above, a bootstrapping analysis was used in the current analyses for each of the mediation models. This was done with the Preacher and Hayes' (2008) macro for SPSS in order to establish the significance of the mediated effects. The most recent version of the macro uses a bias-corrected bootstrapping approach, which adjusts the central tendency of the distribution provided by the bootstrapping analysis through restricting the confidence intervals to only be centred with the asymmetrical resampled distribution (McCartney et al. 2006; Preacher & Hayes 2008). Using this bias-corrected bootstrapping version ensured that the most powerful statistical techniques for estimating the confidence intervals of the indirect effects were employed and that in turn the most precise results were used when checking for mediation (McCartney et al. 2006; Preacher & Hayes 2008).

Additionally, all regressions were carried out, even without the presence of a significant direct relationship between activity engagement and risk-taking in the first step, after the covariates had been entered. It has been proposed that it is not necessary for a direct relationship between the independent and dependent variable to be present originally in order to find a significant indirect effect (Preacher & Hayes, 2004; Preacher & Hayes, 2008). Although somewhat controversial, this argument has been supported by various respectable researchers, such as MacKinnon, Fairchild and Fritz (2007), who stated that requiring a significant direct relationship to exist before testing for mediation reduces the power to detect mediation because there are many situations in which significant indirect relationships exist, even without a direct relationship between the independent and dependent variables. These suggestions were included in the analyses and I examined for the presence of both indirect and mediated effects, even without a direct effect being initially present. Such requirements allowed for a more comprehensive examination of the possible relationships between all variables.

Results

Preliminary Analyses

The descriptive statistics for all of the variables are show in Table 3. Before my primary analyses were conducted, I screened for normality through an examination of the descriptive statistics, which revealed high congruency among the mean, median and mode for each potential co-variate, independent, mediator and dependent variable. Any variable with a skewness level outside of |3| was deemed to be skewed and required further examination. This cut-off point to determine skewness was selected as it has been found to be the point in which a distribution can no longer be regarded as normal, which is a requirement for analyses to be conducted correctly (Gravetter & Wallnau, 2004). Upon further examination of the skewness and kurtosis levels for each variable, it was noted that several distributions were skewed. In order to correct for this, Log10 transformations were conducted on the skewed distributions. Through the Log10 transformations all but one distribution was brought within normal range. Consideration of the histograms for each transformed variable reinforced this conclusion, through showing distributions of all variables, except one, within the normal parameters. The variable that remained skewed was the SPPA importance of close friends, however upon comparison between the original skewness and kurtosis levels, it was observed that the normality of this variable had significantly improved through the Log10 transformation. Thus it was retained for the later analyses. Square Root transformations were also conducted on the skewed distributions. However, it was determined that the Log10 transformations resulted in skewness and kurtosis scores that showed a higher degree of normality.

Table 3. *Means and Standard Deviations for Covariates, Predictor, Mediators, and Criterion Variables (N=276)*

	Scores							
	M	*SD*	*Range*	*Skewness*	*Kurtosis*	*Skewness log transformed*	*Kurtosis log transformed*	*α*
Potential Covariates								
Age	19.06	1.60	18-25	1.84	2.92			
Gender	0.11	0.31	0-1	2.52	4.36			
Average parent education	3.25	0.89	1-5	-0.17	-0.59			
Social desirability	1.44	0.13	1.03-1.82	0.20	0.46			0.66
Predictor and mediator variables								
Adaptive physical health risk-taking	3.39	0.50	1.67-4.00	-0.99	0.60	0.40	-0.64	0.74
Maladaptive physical health risk-taking	1.58	0.43	1-3.10	0.94	0.77	0.55	-0.12	0.72
Adaptive social risk-taking	2.57	0.40	1.42-3.58	-0.18	-0.13			0.73
Maladaptive social risk-taking	1.51	0.33	1.00-2.90	1.15	2.36	0.67	0.78	0.72
Grades	3.08	0.73	2-6	-0.07	0.34			
SPPA scholastic performance	2.74	0.58	1.40-4.00	0.12	-0.38			0.71
Positive peers	3.82	0.73	1.00-5.00	-1.00	1.43	0.05	-0.19	0.76
Social interest score	1.64	0.19	1.00-2.00	-0.62	-0.06	0.32	-0.49	0.66
SPPA importance close friends	3.57	0.63	1.00-4.00	-1.87	3.79	1.07	0.24	0.64
Criterion variables								
Psychological engagement	4.17	0.49	1.00-5.00	-1.07	0.95	0.34	-0.77	0.87
Behavioural engagement	4.91	0.43	2.00-6.00	-0.72	-0.42	0.10	-1.25	0.50

Note: Possible Ranges:. Gender (1-males, 0=female); Parent education (1 = did not finish high school, 2 = finished high school, 3 = some college or university, 4 = finished college or university, 5 = graduate degrees or professional degree); Social desirability (1 = false, 2 = true); Risk-taking (1 = never, 2 = rarely, 3 = sometimes, 4 = often); Grades (1 = below 50%, 2 = 50-59%, 3 = 60-69%, 4 = 70-79 %, 5 = 80-89%. 6 = 90-100%); SPPA Scholastic performance (1 = very uncharacteristic, 2 = somewhat uncharacteristic, 3 = somewhat characteristic, 4 = very characteristic); Positive Peers (1= a lot, 2 = quite a bit, 3 = somewhat, 4 = little bit, 5 = not at all); social interest score (1= low social interest, 2 = high social interest)

Outliers were also examined. This was done by converting the scores into z-scores and examining the maximum and minimum values.; any data points outside of |3| standard deviations were examined further. As previously mentioned, this cut-off point was selected because the values that fall within these points represent 99.87% of the scores in the distribution and it follows the general rule of thumb used to determine which participant is an outlier (Gravetter & Wallnau, 2004). Further analyses revealed the presence of 22 univariate outliers with z-score values ranging from- 4.06 to 4.27. The scores of these 22 participants on all variables (including time to complete survey, which was available through the online software) were closely examined. I determined that they did not differ enough on any variables to warrant deletion, thus they were noted and kept in the analyses.

Missing Values

Prior to the primary analyses, the data were checked to see if there was a problem with missing data. First, correlations were obtained for all pertinent variables in the analysis, using listwise deletion, which meant that any participant missing data would be excluded. Thus, the sample size of this analysis would be an indication of how many participants were missing data on any variable. The resulting sample size ($N = 263$) from this procedure was compared to that of the entire data set ($N = 276$), demonstrating that only 13 individuals were missing data on all of the variables and that no more than 5% of the cases were missing. Thus, following accepted guidelines I assumed that there was no problem with missing data (Gravetter & Wallnau, 2004).

To check further for a potential problem with missing data, a Missing Values Analysis was conducted. Through this analysis I determined that no variables had more than 5% missing data, which again fell within the acceptable range (Gravetter & Wallnau, 2004).

Correlations

As previously mentioned, several variables were considered as potential covariates through examination of the zero-order correlations between age, gender, social desirability, activity engagement, risk-taking and the variables selected to represent the RBT systems. The corresponding zero-order correlations showing the direction and magnitude of the relationships between these variables are shown in Table 4.

The correlations demonstrated that the potential covariates related significantly to some of the variables of interest. Social desirability was found to be significantly related to several of the RBT mediator variables and was therefore included as a covariate during the later regression analyses. Age and average parent education also demonstrated several significant correlations with the variables of interest and therefore were also included as covariates.

Upon investigation of the correlations between risk-taking behaviours, I noted that the adaptive risk behaviours were correlated with one another (r = .64), as were the maladaptive behaviours (r = .46). Conversely, when the correlations within the two types of risk-taking (e.g., correlation between adaptive social and maladaptive social) were examined it was observed that there were no strong correlations between adaptive and maladaptive behaviours within either type of risk-taking, which was expected (physical health risks; r = -.27; social risks, r = .15).

Table 4. *Correlations between Demographic, Predictor, Mediators, and Criterion Variables (N=276)*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Age	--														
2. Gender	.19**	--													
3. Average parent education	.03	-.01	--												
4. Social desirability	.03	-.10	.08	--											
5. Adaptive physical health risk-taking	-0.09	-.16**	.07	.11	--										
6. Maladaptive physical health risk-taking	.05	.14*	-.03	-.33**	-.27**	--									
7. Adaptive social risk-taking	-.18**	-.11	.10	.09	.64**	-.00	--								
8. Maladaptive social risk-taking	-.11	.23**	.02	-.43**	-.13*	.46**	.15*	--							
9. Grades	-.09	-.09	-.21**	-.08	-.07	.14*	-.08	.05	--						
10. SPPA scholastic performance	.05	.16*	.07	.15*	.10	-.03	.13*	-.02	-.47**	--					
11. Positive peers	.02	-.18**	.10	.34**	.15*	-.59**	-.03	-.50**	-.12	.12	--				
12. Social interest score	-.04	-.30**	.14*	.19**	.32**	-.19**	.28**	-.26**	-.05	.03	.17**	--			
13. SPPA importance close friends	-.05	-.13*	-.06	.01	.23**	-.17**	.18**	-.19**	-.01	.03	.18**	.25**	--		
14. Psychological engagement	-.02	-.09	.04	.13*	.04	-.01	.18**	-.06	-.06	.05	-.05	.10	.07	--	
15. Behavioural engagement	.00	.08	.01	-.04	-.12	.15*	-.02	.03	-.05	.03	-.16*	-.02	-.04	.33	--

Note. *p ≤ .05, **p ≤ .01

Associations with Gender. Gender was considered as a potential moderator of the relationship between activity engagement and youth risk-taking. As previously mentioned, there was not enough variability in the current sample to carry out a moderation analysis, but an investigation of the correlations revealed several interesting associations with gender among the various risk-taking behaviours. However, upon investigation of the correlations, gender emerged as being significantly related to three of the four outcome risk-taking variables and four out of the five RBT mediator variables. There was a significant negative correlation between gender and adaptive physical health risk-taking (r = -.16), demonstrating that being male was associated with fewer of these risk behaviours than was seen with females. Additionally, there were two significant positive correlations between gender and maladaptive physical health (r = .14) and maladaptive social risk-taking (r = .23), demonstrating that in the current study being male was associated with more maladaptive risk behaviours than was seen with females. Additionally, there were significant correlations between gender and SPPA Scholastic performance (r = .16), positive peers (r = -.18), social interest (r = -.30), and SPPA importance of close friends (r = -.13). These correlations revealed that in the current study being male was associated with higher scholastic performance according to the SPPA, less positive peers, a lower degree of social interest and less importance being placed on having close friends, as compared to females. Gender was not found to be significantly correlated with either behavioural or psychological engagement. On the basis of the other significant relationships I included gender as a covariate on step one of the regression analyses. These associations between gender and the various risk-taking variables are examined further in the discussion section.

Residuals

An analysis of the residuals was conducted to determine if the models met the underlying assumptions of normality, homoscedasticity and model specificity. For each of the four models, I

examined the corresponding histograms and normal P-P plots of standardized residuals, which showed that all four models were relatively normally distributed, signifying that there were no violations of the assumption of normality.

Additionally, for each model, the corresponding plots between the standardized residuals and standardized predicted values also were visually examined and showed that the residuals were relatively equally distributed throughout the four quadrants of the plots. This indicated that the assumption of homoscedasticity was not violated.

In order to evaluate the independence of residuals, I examined the Durbin Watson statistic for each model. For the model predicting adaptive physical health risk-taking, the obtained value was 2.29; for maladaptive physical health risk-taking, the value was 1.87; for adaptive social risk-taking, the value was 1.97; and for maladaptive social risk-taking, the value was 2.00. All values obtained for the Durbin Watson statistics fell within the acceptable values for this statistic (Gravetter & Wallnau, 2004).

To examine the residuals further, the Mahalanobis Distance values were examined for each model. Although the range was slightly high ($M = 10.98$, $SD = 5.43$), it still fell within the acceptable range for the given sample.

Primary Analyses

To test the hypotheses that grades, SPPA scholastic performance, positive peers, social interest scores, and SPPA importance of close friends (i.e., the variables selected to represent the systems in RBT) would partially mediate the effect of activity engagement on four different categories of risk-taking behaviour, three separate hierarchical regression models were run for each individual risk-taking category (i.e., four separate analyses were completed). Mediation was assessed using the method established by Baron and Kenny (1986). For each of the four analyses, the established covariates (i.e., age, sex, parental education, and social desirability) were entered

on step 1 in order to partial out their potential relationships with activity engagement or the RBT mediator variables on risk-taking. Additionally, in each of the analyses, activity engagement acted as the IV and the five RBT variables served as potential mediators. Each separate risk-taking analysis is discussed in turn below.

Adaptive Physical Health Risk-Taking

The first model of this analysis tested the direct effect of activity engagement on adaptive physical health risk-taking, through regressing risk-taking on engagement in step 2. In the second model, the five RBT mediator variables were regressed on activity engagement in step 2 in order to asses the direct effect of activity engagement on the selected mediator variables. The third regression model tested the indirect effect of activity engagement on adaptive physical health risk-taking in the presence of the RBT mediator variables. This was done through regressing adaptive physical health risk-taking on activity engagement and the five RBT mediator variables, which were entered simultaneously as predictors in step 2. The results of the mediation analyses are shown in Table 5.

The first model in Table 5 showed that, in contrast to what was predicted, when the covariates were partialled out, activity engagement was not significantly associated with adaptive physical health risk-taking [$\Delta F(2,253) = 2.11, \Delta R^2 = .02, p = .12$]. However, as previously mentioned the mediation analysis was continued even without the presence of a direct effect (see MacKinnon, Fairchild & Fritz; 2007; Preacher & Hayes, 2004; Preacher & Hayes, 2008). Although it is not common practice to report the significance of individual predictors, as the overall step was not significant, these analyses are exploratory. With caution, therefore, I report that behavioural engagement had a significant negative relationship with adaptive physical health risk-taking, whereas the relation between psychological engagement and adaptive physical health risk-taking had no statistical significance.

Table 5. *Regression Models Testing the Mediated Effect of the Behaviour, Perceived Environment and Personality Systems on Adaptive Physical Health Risk-Taking over and above Age, Sex, SES and Social Desirability*

Predictor	*B*	*SE*	*β*	*sr2*	*ΔR2*	*Δf*	*df*	*p*	*Criterion*
Model 1	Direct effect of Activity Engagement on Adaptive Physical Health Risk-Taking								
Psychological Engagement	0.04	0.05	0.05	0.23	0.02	2.11	2,253	0.12	Adaptive Physical Health Risk-Taking
Behavioural Engagement	-0.08*	0.04	-0.13	0.36					
Model 2	Direct effect of Activity Engagement on Mediators								
Psychological Engagement	0.16	0.29	0.04	0.19	0.00	0.38	2,251	0.68	Grades
Behavioural Engagement	0.10	0.22	0.03	0.17					
Psychological Engagement	-0.11	0.23	-0.03	0.17	0.00	0.16	2,251	0.85	SPPA scholastic performance
Behavioural Engagement	-0.02	0.18	-0.01	0.09					
Psychological Engagement	-0.03	0.05	-0.04	0.19	0.02	2.21	2,251	0.10	Positive peers
Behavioural Engagement	-0.07	0.04	-0.10	0.33					
Psychological Engagement	0.02	0.02	0.07	0.26	0.00	0.59	2,251	0.55	Social interest score
Behavioural Engagement	-0.01	0.02	-0.04	0.20					
Psychological Engagement	0.08	0.06	0.09	0.29	0.01	0.98	2,251	0.38	SPPA importance close friends
Behavioural Engagement	-0.05	0.05	-0.06	0.24					
Model 3	Indirect effect of Activity Engagement on Mediators								
Psychological Engagement	0.02	0.05	0.03	0.00					
Behavioural Engagement	-0.07	0.04	-0.11	0.01					
Grades	0.01	0.01	0.04	0.00					
SPPA scholastic performance	-0.01	0.01	-0.06	0.01	0.12**	4.97	7,246	0.00	Adaptive Physical Health Risk-Taking
Positive peers	-0.01	0.01	-0.05	-0.03					
Social interest score	0.51**	0.14	0.23	0.09					
SPPA importance close friends	0.12*	0.05	0.15	0.03					

Note. *p≤.05, **p≤.01

Results of model 2 demonstrated that there were no direct relationships observed between the RBT mediators and activity engagement, which was in contrast to what was expected.

As was predicted, model 3 demonstrated that the significant relationship that behavioural engagement had with adaptive physical health risk-taking in model 1 decreased, when controlling for the RBT mediators (and the covariates in step 1). Even without the presence of a direct relationship between activity engagement and adaptive physical health risk-taking in model 1, it seemed that the RBT variables may have had some mediational affect on the relationship between a specific aspect of engagement (i.e., behavioural engagement) and adaptive physical health risk-taking.

As was discussed in the method section, the significance of indirect effect of the RBT mediator variables on adaptive physical health risk-taking was tested using Preacher and Hayes' (2008) bootstrapping macro. The new sampling distribution, confidence intervals, value and standard error were obtained through taking 10,00 bootstrapping resamples (N ~ 276) for both behavioural and psychological engagement. Results of this analysis revealed that the direct effect of behavioural (ab = .02, SE = .02 , CI_{95} = -.01, .06) and psychological engagement (ab = -.01, SE = .01 , CI_{95} = -.04, .01) on adaptive physical health risk-taking were not partially mediated by the RBT mediator variables, which was in contrast to my expectations. This was determined from the observation that the bootstrapping-derived confidence intervals crossed over zero, which indicated that the value of the indirect effect on adaptive physical health risk-taking was not significantly different than what would be assumed under the null hypothesis.

The hypothesis predicting that the RBT variables would partially mediate the relationship between activity engagement and adaptive physical health risk-taking was not supported. Although there was a decrease in the strength of the relationship between one aspect of activity

engagement when the RBT mediator variables were included as simultaneous predictors, the RBT variables' effect was not found to be significant when assessed by a bootstrapping analysis.

Maladaptive Physical Health Risk-Taking

The first model of this analysis tested the direct effect of activity engagement on maladaptive physical health risk-taking, through regressing risk-taking on engagement in step 2. In the second model, the five RBT mediator variables were regressed on activity engagement in step 2 in order to asses the direct effect of activity engagement on the selected mediators. The third regression model tested the indirect effect of activity engagement on maladaptive physical health risk-taking in the presence of the RBT variables. This was done through regressing maladaptive physical health risk-taking on activity engagement and the five RBT mediator variables, which were entered simultaneously as predictors in step 2. The results of the mediation analyses are shown in Table 6.

The first model in Table 6 shows that with the covariates partialled out, in contrast to what was predicted, activity engagement was not significantly associated with maladaptive physical health risk-taking [$\Delta F(2,253) = 2.75$, $\Delta R^2 = .02$, $p = .06$]. However, further exploratory analyses revealed that behavioural engagement was a significant negative predictor of maladaptive physical health risk-taking, whereas psychological engagement was not significant.

As with the results from the analysis of adaptive physical health risk-taking, model 2 demonstrated that there were no significant direct relationships between the selected RBT mediator variables and activity engagement.

Table 6. *Regression Models Testing the Mediated Effect of the Behaviour, Perceived Environment and Personality Systems on Maladaptive Physical Health Risk-Taking over and above Age, Sex, SES and Social Desirability*

Predictor	*B*	*SE*	*β*	*sr2*	*ΔR2*	*Δf*	*df*	*p*	*Criterion*
Model 1	Direct effect of Activity Engagement on Maladaptive Physical Health Risk-Taking								
Psychological Engagement	-0.01	0.03	-0.01	0.07	0.02	2.75	2,253	0.06	Maladaptive Physical Health Risk-Taking
Behavioural Engagement	-0.04*	0.02	-0.13	0.37					
Model 2	Direct effect of Activity Engagement on Mediators								
Psychological Engagement	0.16	0.29	0.04	0.19	0.00	0.38	2,251	0.68	Grades
Behavioural Engagement	0.10	0.22	0.03	0.17					
Psychological Engagement	-0.11	0.23	-0.03	0.17	0.00	0.16	2,251	0.85	SPPA scholastic performance
Behavioural Engagement	-0.02	0.18	-0.01	0.09					
Psychological Engagement	-0.03	0.05	-0.04	0.19	0.02	2.21	2,251	0.10	Positive peers
Behavioural Engagement	-0.07	0.04	-0.10	0.33					
Psychological Engagement	0.02	0.02	0.07	0.26	0.00	0.59	2,251	0.55	Social interest score
Behavioural Engagement	-0.01	0.02	-0.04	0.20					
Psychological Engagement	0.08	0.06	0.09	0.29	0.01	0.98	2,251	0.38	SPPA importance close friends
Behavioural Engagement	-0.05	0.05	-0.06	0.24					
Model 3	Indirect effect of Activity Engagement on Mediators								
Psychological Engagement	0.01	0.02	0.02	0.92	0.28**	16.44	7,246	0.00	Maladaptive Physical Health Risk-Taking
Behavioural Engagement	-0.02	0.02	-0.07	0.93					
Grades	0.01*	0.01	0.15	0.40					
SPPA scholastic performance	0.02*	0.01	0.13	0.38					
Positive peers	-0.05**	0.01	-0.51	0.89					
Social interest score	-0.03	0.02	-0.07	0.90					
SPPA importance close friends	-0.05	0.01	-0.05	0.94					

Note. *p≤.05, **p≤.01

Model 3 demonstrated that the significant relationship that behavioural engagement had with maladaptive physical health risk-taking in model 1 was no longer significant when including the RBT mediators in the model (and the covariates in step 1). Even without the presence of a direct relationship between activity engagement and maladaptive physical health risk-taking in model 1, it seemed that the RBT variables may have had some mediational effect on the relationship between a specific aspect of engagement (i.e., behavioural engagement) and maladaptive physical health risk-taking.

In contrast to what was predicted, the results of the bootstrapping analysis revealed that the effects of behavioural (ab = -.02, SE = .01 , CI_{95} = -.04, -.003) and psychological engagement (ab = -.01, SE = .01 , CI_{95} = -.03, .03) on maladaptive physical health risk-taking were not partially mediated by the RBT mediator variables. This was determined from the observation that the bootstrapping-derived confidence intervals crossed over zero, which indicated that the value of the indirect effect on adaptive physical health risk-taking was not significantly different than what would be assumed under the null hypothesis.

Thus, the hypothesis predicting that the RBT variables would partially mediate the relationship between activity engagement and maladaptive physical health risk-taking was not supported.

Adaptive Social Risk-Taking

Similar to the previous analyses, the first model of this analysis tested the direct effect of activity engagement on adaptive social risk-taking, through regressing risk-taking on engagement in step 2. In the second model, the five RBT mediator variables were regressed on activity engagement in step 2 in order to asses the direct effect of activity engagement on the selected mediator variables. The third regression model tested the indirect effect of activity engagement on adaptive social risk-taking in the presence of the RBT mediator variables. This was done

through regressing adaptive social risk-taking on activity engagement and the five RBT mediator variables, which were entered simultaneously as predictors in step 2. The results of the mediation analyses are shown in Table 7.

The first model in Table 7 shows that with the covariates partialled out, activity engagement was significantly associated with adaptive social risk-taking [$\Delta F(2,253) = 4.35, \Delta R^2 = .03, p = .01$]. When examining the influence of the two aspects of activity engagement separately (i.e., behavioural *and* psychological engagement) it was interesting to note that psychological engagement was a significant positive predictor of adaptive social risk-taking, whereas behavioural engagement was not significant. This was in contrast to what was observed when the two physical health risk-taking categories were analyzed (i.e., behavioural engagement was related to physical health risks and psychological engagement was not).

As with the results from the analyses of the previous risk-taking behaviours, model 2 demonstrated that there were no significant direct relationships between the RBT mediator variables and activity engagement.

As was predicted, model 3 demonstrated that the significance of the relationship that psychological engagement demonstrated in model 1 had decreased, albeit remaining significant, when including the RBT mediators in the model (and the covariates in step 1). The direct relationship between activity engagement (specifically psychological engagement) and adaptive social risk-taking may have been partially mediated by the RBT mediators. I then conducted a bootstrapping analysis in order to asses the significance of the possible mediation.

Table 7. *Regression Models Testing the Mediated Effect of the Behaviour, Perceived Environment and Personality Systems on Adaptive Social Risk-Taking over and above Age, Sex, SES and Social Desirability*

Predictor	*B*	*SE*	*β*	*sr²*	*ΔR²*	*Δf*	*df*	*p*	*Criterion*
Model 1	Direct effect of Activity Engagement on Adaptive Physical Health Risk-Taking								
Psychological Engagement	0.46**	0.16	0.19	0.42	0.03*	4.35	2,253	0.01	Adaptive Social Risk-Taking
Behavioural Engagement	0.18	0.12	0.09	0.31					
Model 2	Direct effect of Activity Engagement on Mediators								
Psychological Engagement	0.16	0.29	0.04	0.19	0.00	0.38	2,251	0.68	Grades
Behavioural Engagement	0.10	0.22	0.03	0.17					
Psychological Engagement	-0.11	0.23	-0.03	0.17	0.00	0.16	2,251	0.85	SPPA scholastic performance
Behavioural Engagement	-0.02	0.18	-0.01	0.09					
Psychological Engagement	-0.03	0.05	-0.04	0.19	0.02	2.21	2,251	0.10	Positive peers
Behavioural Engagement	-0.07	0.04	-0.10	0.33					
Psychological Engagement	0.02	0.02	0.07	0.26	0.00	0.59	2,251	0.55	Social interest score
Behavioural Engagement	-0.01	0.02	-0.04	0.20					
Psychological Engagement	0.08	0.06	0.09	0.29	0.01	0.98	2,251	0.38	SPPA importance close friends
Behavioural Engagement	-0.05	0.05	-0.06	0.24					
Model 3	Indirect effect of Activity Engagement on Mediators								
Psychological Engagement	0.37*	0.15	0.15	0.39	0.11**	4.64	7,246	0.00	Adaptive Social Risk-Taking
Behavioural Engagement	0.17	0.12	0.09	0.31					
Grades	-0.01	0.04	-0.03	0.16					
SPPA scholastic performance	0.01	0.05	0.12	0.33					
Positive peers	-0.07*	0.04	-0.14	0.36					
Social interest score	-0.90*	0.44	-0.13	0.36					
SPPA importance close friends	-0.44**	0.16	-0.17	0.42					

Note. *p≤.05, **p≤.01

In contrast to my predictions, results of the bootstrapping analysis revealed that the effects of behavioural (ab = -.002, SE = .04 , CI_{95} = -.09, .08) and psychological engagement (ab = -.08, SE = .06 , CI_{95} = -.2, .02) on adaptive social risk-taking were not significantly mediated by the RBT mediator variables. This was determined from the observation that the bootstrapping-derived confidence intervals crossed over zero, which indicated that the value of the indirect effect on adaptive social risk-taking was not significantly different than what would be assumed under the null hypothesis.

Thus, the hypothesis predicting that the RBT variables would partially mediate the relationship between activity engagement and adaptive social risk-taking was not supported.

Maladaptive Social Risk-Taking

The first model of this analysis tested the direct effect of activity engagement on maladaptive social risk-taking, through regressing risk-taking on engagement in step 2. In the second model, the five RBT mediator variables were regressed on activity engagement in step 2 in order to asses the direct effect of activity engagement on the selected mediator variables. The third regression model tested the indirect effect of activity engagement on maladaptive social risk-taking in the presence of the RBT mediator variables. This was done through regressing maladaptive social risk-taking on activity engagement and the five RBT mediator variables, which were entered simultaneously as predictors in step 2. The results of the mediation analyses are shown in Table 8.

The first model in Table 8 showed that in contrast to what was predicted, when the covariates were partialled out, activity engagement was not significantly associated with maladaptive social risk-taking [$\Delta F(2,253) = 0.03$, $\Delta R^2 = .00$, $p = .97$]. When examining the influence of the two aspects of activity engagement separately (i.e., behavioural *and* psychological engagement), it was noted that with maladaptive social risk-taking neither

behavioural nor psychological engagement significantly predicted this behaviour. Nonetheless, as with earlier regressions, the analysis was continued even without the presence of a direct effect. However, neither aspect of activity engagement significantly predicted risk-taking and the magnitude of any association between the two was extremely weak. Thus, it was expected that the later models would not display any significant relationship.

As with the results from the analysis of adaptive physical health risk-taking, model 2 demonstrated that there were no significant direct relationships between the RBT mediator variables and activity engagement.

In contrast to what was hypothesized, model 3 demonstrated that the relationship between activity engagement and maladaptive social risk-taking did not decrease when controlling for the RBT mediators (and the covariates in step 1). However, when noting the weak magnitude and direction of the non-significant relationship between activity engagement and maladaptive social risk-taking demonstrated in model 1, it was expected that model 3 of this analysis would not be able to influence the extremely weak association between the two variables.

Results of a bootstrapping analysis revealed that the effects of behavioural (ab = -.01, SE = .01 , CI_{95} = -.02, .02) and psychological engagement (ab = .001, SE = - .01 , CI_{95} = -.02, -.01) on maladaptive social risk-taking were not significantly mediated by the RBT mediator variables, which was expected due to the lack of a significant direct or indirect relationship.

Thus, the hypothesis predicting that the RBT variables would partially mediate the relationship between activity engagement and maladaptive social risk-taking was not supported.

Table 8. *Regression Models Testing the Mediated Effect of the Behaviour, Perceived Environment and Personality Systems on Maladaptive Social Risk-Taking over and above Age, Sex, SES and Social Desirability*

Predictor	*B*	*SE*	*β*	*sr2*	*ΔR2*	*Δf*	*df*	*p*	*Criterion*
Model 1	Direct effect of Activity Engagement on Adaptive Physical Health Risk-Taking								
Psychological Engagement	-0.00	0.02	-0.01	0.10	0.00	0.03	2,253	0.97	Maladaptive Social Risk-Taking
Behavioural Engagement	0.00	0.01	0.01	0.12					
Model 2	Direct effect of Activity Engagement on Mediators								
Psychological Engagement	0.16	0.29	0.04	0.19	0.00	0.38	2,251	0.68	Grades
Behavioural Engagement	0.10	0.22	0.03	0.17					
Psychological Engagement	-0.11	0.23	-0.03	0.17	0.00	0.16	2,251	0.85	SPPA scholastic performance
Behavioural Engagement	-0.02	0.18	-0.01	0.09					
Psychological Engagement	-0.03	0.05	-0.04	0.19	0.02	2.21	2,251	0.10	Positive peers
Behavioural Engagement	-0.07	0.04	-0.10	0.33					
Psychological Engagement	0.02	0.02	0.07	0.26	0.00	0.59	2,251	0.55	Social interest score
Behavioural Engagement	-0.01	0.02	-0.04	0.20					
Psychological Engagement	0.08	0.06	0.09	0.29	0.01	0.98	2,251	0.38	SPPA importance close friends
Behavioural Engagement	-0.05	0.05	-0.06	0.24					
Model 3	Indirect effect of Activity Engagement on Mediators								
Psychological Engagement	0.00	0.02	0.00	0.06	0.13**	7.67	7,246	0.00	Maladaptive Social Risk-Taking
Behavioural Engagement	0.02	0.01	0.06	0.27					
Grades	0.00	0.00	0.02	0.14					
SPPA scholastic performance	0.00	0.01	0.07	0.27					
Positive peers	-0.03**	0.00	-0.35	0.61					
Social interest score	0.09	0.05	0.10	0.33					
SPPA importance close friends	0.03	0.02	0.08	0.32					

Note. *p≤.05, **p≤.01

Discussion

The goal of the present research was to investigate the potential relationship between youth activity engagement and various risk-taking behaviours. Specifically, the I examined whether two different types of risk-taking (i.e., social and physical health) and two different dimensions of these types (i.e., adaptive and maladaptive) were related to two aspects of activity engagement (i.e., behavioural and psychological) through an indirect link through five mediator variables (i.e., grades, scholastic performance, social interest, importance of close friends, and exposure to positive peers). These potential mediators represented the three systems within RBT (i.e., the behaviour, perceived environment and personality systems).

In the study, I addressed several major hypotheses, which were tested using mediation analyses. First I tested the prediction that activity engagement would relate to the various youth risk-taking behaviours. The risk-taking behaviours that were specifically examined were adaptive physical health risk-taking, maladaptive physical health risk-taking, adaptive social risk-taking, and maladaptive social risk-taking. Second, I tested the hypothesis that activity engagement would relate to the five variables selected to represent the RBT systems. The five variables that were selected were grades and scholastic performance to represent the behaviour system, social interest and importance of close friends to represent the personality system and positive peers to represent the perceived environment system. Third, I tested the hypothesis that the RBT mediator variables, when analyzed simultaneously with activity engagement, would significantly reduce the direct effect of engagement on risk-taking; demonstrating significant indirect meditational effect of the RBT mediator variables on the association between activity engagement and youth risk-taking.

In order to address these postulations, 276 mid- to late- youth from the undergraduate population of Brock University in St. Catharines, Ontario, Canada, completed self-report

measures assessing risk-taking frequencies, activity engagement, and each of the five RBT mediator variables.

Associations with Gender

Although there was not enough variability in the sample to consider gender as a potential moderator of the relationship between activity engagement and youth risk-taking, several interesting findings did emerge when the correlations between gender and the various risk categories were examined.

Adaptive Physical Health Risk-Taking. Overall, this risk behaviour had the highest mean level of participation and a significant negative correlation revealed that in the current sample being male was associated with less engagement in these risks than females. This finding was consistent with the literature on risk-taking and gender, which has indicated that males as compared to females, are less likely to engage in adaptive physical health risk behaviours and more likely to engage in maladaptive physical health risk behaviours (Coppens & Gentry, 1991; Ginsburg & Miller, 1982; Rosen & Peterson, 1990). As previously mentioned, this association may be due to differences in socialization patterns (Block, 1983; Morrongiello & Dawber, 1999), varying beliefs about injury vulnerability (Morrongiello & Dawber, 1999), and differences in risk appraisals between male and female youth (Hillier & Morrongiello, 1998).

Maladaptive Physical Health Risk-Taking. This behaviour demonstrated a low mean level of participation and a significant positive correlation revealed that in the current sample being male was associated with more engagement in these risks than being female. This finding was consistent with what was expected, as the literature has demonstrated that males are more likely to engage in maladaptive physical health risk behaviours than females (Coppens & Gentry, 1991; Ginsburg & Miller, 1982; Rosen & Peterson, 1990). Additionally, this finding demonstrated that when designing intervention efforts to focus on maladaptive physical health

risks one may want to tailor their efforts to males, as male youth may be the most at risk for such behaviours.

Adaptive Social Risk-Taking. Overall, this behaviour had the second highest mean level of participation. There was no significant correlation with gender, which did not contradict any expectations as there were no predictions for the association between gender and social risk-taking.

Maladaptive Social Risk-Taking. This risk behaviour had the lowest mean level of participation. There was a significant positive correlation with gender, demonstrating that in the current sample being male was associated with more engagement in these behaviours than being female. There were no expectations for the observed association with gender and maladaptive social risk-taking, but this finding was inconsistent with previous work on gender differences in relational aggression (e.g., gossip or peer exclusion), which is a behaviour similar to maladaptive social risk-taking. Some research has shown than females are more likely to engage in these socially aggressive acts than males (Crick & Grotpeter, 1995; Eagly & Steffen, 1986; Loeber & Hay, 1997). However, more recent research has put forth the argument that males are more physically and socially aggressive than females, but if females are going to be aggressive they are likely to exhibit social aggression rather than physical (Salmivalli & Kaukiainen, 2004). Considering the inconsistencies in previous research on social aggression, future work should be conducted to deepen the understanding of maladaptive social risk-taking as it compares to relational aggression and any possible differences between the genders that may exist.

Summary of Associations with Gender. Overall, it appears that in the current sample, that there were gender associations with the trajectories of the various risk-taking categories. In the current study being male appeared to be associated with more engagement in both maladaptive risk behaviours than being female, which is consistent with previous research that

has indicated that males, as compared to females, are more likely to engage in maladaptive risk behaviours (Coppens & Gentry, 1991; Ginsburg & Miller, 1982; Rosen & Peterson, 1990). Additionally, being male was associated with less engagement in adaptive physical health risks than being female, which again was consistent with previous literature. However, the specific finding that being male in the current sample was associated with a greater likelihood to engage in maladaptive social risks seems contradictory with some of the previous work on gender differences in relational aggression and more research is needed to investigate the differences between these risks and aggression. Additionally, future work should also attempt to investigate the relationship between activity engagement and youth risk-taking in a sample representative of both males and females. Such work may shed light on the ways that activity engagement may differentially impact various risk-taking behaviours in both genders. Additional suggestions for future studies investigating the potential associations with gender are discussed in the limitations section.

Associations with Age

There were no specific expectations for age differences in the various risk-taking behaviours. Additionally, I did not conduct a longitudinal examination of the relationship between activity engagement and youth risk-taking, so I cannot comment on the development of such behaviours without longitudinal data. Upon investigating the correlations between age and the various risk behaviours, there was only one significant negative correlation, which was between age and adaptive social risk-taking. However, future work is still needed to understand the possible age differences in various risk-taking categories and the development of such behaviours. Studies should aim to investigate the relationship between youth risk-taking and activity engagement longitudinally and in a sample of various ages, including younger participants. Suggestions for future studies are discussed in the limitations section.

Risk-Taking Frequencies

In accordance with my expectations, adaptive risk behaviours had higher mean levels of participation than maladaptive risk behaviours. Additionally, the adaptive risk behaviours were correlated with one another, as were the maladaptive behaviours across domains. Conversely, when the correlations within the two types of risk-taking (e.g., correlation between adaptive social and maladaptive social) were examined it was observed that there were no strong correlations between adaptive and maladaptive behaviours within either type of risk-taking, which was expected. These findings are consistent with the conceptual definitions of adaptive risks as compared to maladaptive risks. Previous literature has indicated that adaptive risks are behaviours where the benefits of engaging in the risk outweigh the potential downfalls and maladaptive risks are behaviours where the potential downfalls outweigh the benefits (Baumrind, 1987; Baumrind, 1991; Byrnes et al., 1999). Thus, it should not be surprising to observe that youth in the current sample demonstrated higher mean levels of participation in adaptive risk behaviours more so than maladaptive risk behaviours. Given the frequency of adaptive versus maladaptive risk-taking, it would seem that youth in the current do understand the difference between adaptive and maladaptive risks and that this recognition translates into their rates of engagement in such behaviours. This is in contrast to some common stereotypes that youth are "troublemakers" who engage in a great deal of maladaptive behaviours. The current results indicate that while youth do engage in some maladaptive behaviours, they also engage in a great many adaptive behaviours as well. Such results may indicate that adolescents and emerging adults engage in fewer maladaptive risk behaviours than certain stereotypes give them credit for. However, more research is needed to examine if the current results can be replicated longitudinally and in a wider age range. Additionally, future research should aim to investigate how youth perceive maladaptive risk behaviours as compared to adaptive risks in attempts to

understand if their behaviour tendency toward adaptive risks also translates into their perceptions of risk.

Direct Relationship Between Activity Engagement and Risk-Taking

A separate aspect of youth's lives that was expected to relate to their frequency of participation in the various risk-taking behaviours, was activity engagement. In accordance with my expectations, activity engagement did relate to adaptive physical health risk-taking, maladaptive physical health risk-taking and adaptive social risk-taking. In contrast to what was predicted, activity engagement did not relate to maladaptive social risk-taking. The main effects of activity engagement on each category of risk-taking behaviour are discussed in turn below.

Adaptive Physical Health Risk-Taking. Overall, I found that activity engagement did not significantly relate to this risk-taking behaviour. However, when examining the unique contributions of psychological and behavioural engagement, I found that there was a significant negative relationship between behavioural engagement and adaptive physical health risk-taking, meaning that greater behavioural engagement related to less adaptive physical health risk-taking, unlike overall activity engagement. This was in contrast to the hypothesis that activity engagement would relate positively to adaptive physical health risk behaviours.

This unexpected finding may be due to the fact that my study did not place any restrictions on the types of engagement activities that could be included. A large portion of the participants reported involvement in organized sports (30% of the sample) as the activity in which they participated; no other category of engagement activities had as many participants involved as sports did. Previous literature (e.g., Feldman & Matjasko, 2005; Garry & Morrissey, 2000; Moore & Werch, 2003; Tao et al., 2007) has shown that there may be a negative association between involvement in sports and adaptive physical health behaviours. The relationship between sport involvement and risk-taking behaviours may be due to various

differences between athletes and non-athletes, such an increased need for sensation seeking or negative peer pressures. As a result, athletes may be less inclined to take adaptive physical health risks than non-athletes. Sport involvement also may be associated with greater amounts of behavioural engagement or hands on involvement in the activity (Rose-Krasnor, 2009). Thus, athletes may have higher behavioural engagement scores and may also have lower frequencies of adaptive physical health risk-taking, resulting in the observed negative correlation, as was seen in the study. The percentage of participants involved in sports did not represent the majority of the sample; therefore the biasing effect of sports involvement should have only moderately impacted the results.

Additionally, this unexpected relationship between behavioural engagement and adaptive physical health risk-taking may be due to the fact that this portion of the mediation analysis assessed the unique variance in behavioural engagement (the portion of engagement that is not shared with being psychologically engaged in a positive way). Overall, these findings indicate that in the current study activity engagement in general was not related to adaptive physical health risk-taking, but one specific aspect of engagement (i.e., behavioural engagement) seemed to be associated with this risk behaviour. However, these results need to be interpreted with caution due to the fact that the overall step in the regression was not significant. Further research is needed to investigate the relationship between activity engagement and adaptive physical health risk-taking; restriction of the activities that are included and further investigation of the shared variance between behavioural and psychological engagement may provide more insight into any potential connections between the two aspects of engagement and adaptive physical health risks.

Maladaptive Physical Health Risk-Taking. Overall, it was found that activity engagement did not have a significant relationship with this category of risk-taking. However,

when examining the unique contributions of psychological and behavioural engagement, I found that there was a significant negative relationship between behavioural engagement and maladaptive physical health risk-taking, meaning that greater behavioural engagement related to less maladaptive physical health risk-taking. This finding was consistent with my hypotheses and with the literature, as it has been found that activity engagement promotes positive youth development (Rose-Krasnor, 2009) and can provide youth with developmental assets that may promote greater health planning behaviours and less maladaptive health behaviours (Murphey et al., 2004). Due to their involvement in activities, engaged youth may have had unique opportunities to develop planning skills, received extra-familial support and be exposed to positive social models and peers (Feldman & Matjasko, 2005; Rose-Krasnor, 2009), all of which would likely lead to less frequent engagement in maladaptive physical health risks (Boyer, 2006). In fact, when the unique contributions of psychological and behavioural engagement were examined, I found that they were both negatively related to maladaptive physical health risk-taking (only behavioural was significantly related). Overall, in the current sample youth who are engaged on the behavioural level, seemed to partake in significantly fewer maladaptive physical health risks, possibly due in part to the positive influence that various aspects behavioural activity engagement may have on their lives, such as increased self-esteem or self-efficacy. [3] However, engagement as a whole did not related to maladaptive physical health risk behaviours, as had been expected.

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[3] Although the observed negative association between behavioural engagement and maladaptive physical health risks contradicts what was previously mentioned regarding the behavioural aspect of *sports involvement* relating to fewer adaptive physical health risks, it must be remembered that the majority of participants (70% of the sample) were not involved in sports. Thus the sporting bias toward greater maladaptive risks would not be the case for a large portion of adolescents. Additionally, the negative relationships between all aspects of activity engagement and maladaptive physical health risk-taking were stronger than what was observed with adaptive physical health risk-taking.

Adaptive Social Risk-Taking. Overall, it was found that engagement significantly related to this category of risk behaviour. This finding was consistent with my hypothesis and with previous research on activity engagement and youth social development. The literature has shown that activity engagement can be associated with increased value for social connections and relationships (Feldman & Matjasko, 2005; Rose-Krasnor, 2009). Additionally, engagement can provide an environment for youth to develop meaningful social networks that they value and work to maintain (Feldman & Matjasko, 2005). These social connections tend to involve positive peer models who function as positive reinforcers and act as deterrents against maladaptive behaviours (Reis & Diaz, 1999). It appears that engaged youth may be exposed to positive social interactions and models for their social behaviours, which relates positively to their frequency of engagement in adaptive social risks. In fact, when the unique contributions of psychological and behavioural engagement were examined, they both related positively to adaptive social risk-taking (only psychological was significantly related). Overall, engaged youth, specifically those engaged psychologically, seem to partake in adaptive social risks at a greater frequency, than those who have lower psychological engagement, possibly due in part to the exposure to positive social connections and models for social behaviour in their activities.

Maladaptive Social Risk-Taking. Overall, I found that activity engagement did not significantly relate to this maladaptive risk behaviour. Upon further examination of the unique contributions of psychological and behavioural engagement I noted that neither aspect of engagement significantly related to maladaptive social risks. These findings were in contrast to the hypothesis that activity engagement would relate negatively to maladaptive social risk-taking. From the results it appears that youth do not engage in a great deal of maladaptive social risk behaviours (it had the lowest mean level of engagement) and that activity engagement does not predict their frequency of involvement in such risks. The literature has demonstrated that

engagement should act as a deterrent against maladaptive behaviours (Feldman & Matjasko, 2005; Reis & Diaz, 1999; Rose-Krasnor, 2009), making the reason for this discrepant result unclear. It is possible that the frequency of involvement in maladaptive social risks was already at a "floor" level in the sample selected, given that it was the least frequently engaged in risk behaviour, thus there may have not been enough variance for an effect to be found. In future studies, researchers should aim to study youth involvement in maladaptive social risk-taking and activity engagement on a longitudinal basis and in a variety of populations, such as youth who have been found to display a great deal of peer aggression or bullying. Additionally, various other factors may predict this risk behaviour, such as parenting practices or feelings of acceptance in peer groups, and also should be included in future studies. Such work may help to further the understanding of how activity engagement may relate to social risks over time and within populations with various frequencies of involvement in maladaptive social risks.

Supplemental Finding. A finding of interest regarding the relationship between engagement and risk-taking emerged from the mediation analyses revealed that the two aspects of activity engagement (i.e., behavioural and psychological) were differentially associated with the types of risk-taking. Specifically, it was found that only behavioural engagement was significantly associated with physical health risks and only psychological engagement was significantly associated with social risks. Predictions were not made for which aspects of activity engagement would be related to the types of risk-taking behaviours, but it was very interesting to note the specific and separate effects that each aspect of engagement exhibited over risk-taking. These results suggest that in general, youth who are engaged behaviourally are more likely to demonstrate associations between behavioural engagement and their physical health risk behaviours and youth who are engaged psychologically are more likely to demonstrate associations between psychological engagement and their social risk behaviours. Such

associations are logical when one considers what each type of risk behaviour entails. Physical health risk behaviours by nature involve decisions about physical movements and thus are behavioural in nature. Conversely, social risk behaviours involve decisions about social environments and internal social desires and thus are more psychological in nature. Taken together, these findings emphasize the unique importance of each aspect of activity engagement and demonstrate that in order to work with a variety of risk-taking behaviours, engagement programmers should aim to work with youth on both behavioural and psychological levels, as each are important predictors of outcome behaviour. It is possible that these relationships emerged due to the fact that this study assessed the unique variance of each aspect of engagement. However, further work is still needed and the potential implications from these results for applied work with youth are discussed further below

Summary of Direct Relationship. Taken together, these findings suggest that one hypothesis regarding the direct relationship between activity engagement and risk-taking was supported. Adolescents and emerging adults in the current study who were involved in activities partook in greater adaptive social risks. In particular, it appears that in the current sample, psychological engagement may be what predicts greater adaptive social risks. It seems that engagement activities may provide youth with unique environments where adaptive social interactions and decisions are encouraged and practiced. As a result, some engaged youth may become more aware of the potential benefits associated with adaptive social decisions. It is unclear in the current study why only psychological engagement related to this type of risk behaviour and there is no previous research on such associations that can be referred to. However, the literature on activity engagement, overall, has suggested that activity engagement offers youth a variety of positive opportunities, such as exposure to positive social networks and role models and the development of feelings of accomplishment and importance. As such, the

current literature on the positive youth developments associated with activity engagement would support the postulations that engagement should relate to greater adaptive behaviours, due to the positive environments that youth may be exposed to in such activities (e.g., Feldman & Matjasko, 2005; Reis & Diaz, 1999; Rose-Krasnor, 2009). Researchers should aim to further understand the specific associations between psychological and behavioural engagement and various risk behaviours among youth.

Three of the hypotheses regarding the direct relationship between activity engagement and risk-taking were not supported. Namely, that activity engagement did not relate significantly with adaptive physical health risks, maladaptive physical health risks or maladaptive social risks. However, behavioural engagement was negatively associated with adaptive physical health risks, which was not expected, and negatively associated with maladaptive physical health risks, which was expected . Taken together, these results demonstrate that specific types and aspects of activity engagement may relate differently to youth risk behaviours, but the results here are contradictory. Specifically, engagement in sports may increase adolescents' hands on engagement, which may relate to fewer adaptive physical health behaviours. This may be due to a variety of the aspects of activities with a high degree of behavioural involvement (e.g., sports), such as team dynamics, peer pressure or increased sensation seeking among athletes (e.g., Feldman & Matjasko, 2005; Garry & Morrissey, 2000; Moore & Werch, 2003; Tao et al., 2007). However, it appears that certain aspects of behavioural engagement also may be associated with fewer maladaptive risk decisions and provide youth with an environment where they gain protective factors against maladaptive decisions. Researchers should aim to disentangle the possible longitudinal associations between specific activities and outcome risk-taking behaviours among youth, as they currently remain unclear. Additionally, studies should be conducted on the relationship between particular activities and various risk-taking behaviours (e.g., a study

including equal representations of behavioural and psychological engagement activities). Furthermore, efforts should be made to understand how activity engagement overall (not just the unique aspects) may predict risk behaviours. Thus, the relationship between the unique and shared variance and psychological and behavioural engagement should also be researched. Such studies may lend to the understanding of how specific activities, with varying levels of behavioural and psychological engagement, relate to various risk-taking outcomes in adolescents and emerging adults.

Mediation Analyses

Results of the mediation analyses provided further understanding of the observed relationships between activity engagement and outcome risk-taking. Although results of the bootstrapping analyses revealed that the RBT variables did not significantly mediate the relationship between activity engagement and risk-taking behaviours, as was hypothesized, several interesting results did emerge and are discussed in turn below.

Activity Engagement and Mediators. Results of the mediation analyses demonstrated that activity engagement was not significantly related to any of the five mediator systems,

Results demonstrated that activity engagement did not relate to the perceived environment system (conceptualized as exposure to positive peers). This unexpected finding may have been due to social variables unique to a sample of university students. Namely, researchers have found that university is a time of vastly differing socialization patterns and groupings for various youth and emerging adults (Pittman & Richmond, 2008). Some youth have been found to adjust to the social demands of university better than others, due to various aspects unique to their university social experience, such as feeling a sense of belonging to their new environment and having and perusing positive social experiences in the university environment (Pittman & Richmond, 2008). Due to this potential extraneous influence on some of the participants socialization patterns and

peer groups, it is possible that any potential relationships between activity engagement and exposure to positive peers may have been obscured. Researchers should attempt to examine the potential relationships between activity engagement and exposure to positive peer groups in populations beyond university based samples in order to understand fully the associations between the two variables.

Results also demonstrated that, among youth in the current study, activity engagement did not relate to the behaviour system (conceptualized as current school performance and measured by the SPPA scholastic performance and grades), as was expected. This contradictory finding may be due to several variables unique to a sample of university students. Specifically, it has been found that some youth tend to receive significantly lower grades in university than in high school, due to various aspects exclusive to the their university experience, such as higher expectations than high school, greater competition in their specific programs as compared to others or amount and type of support received (e.g., moving away from home), class size, and their specific social adjustment to university life (Kokkelenberg, Dillon & Christy, 2006; Martinello, Finnie, Mueller, Sweetman & Usher, 2008). The extraneous impact that the university experience may have had on certain participants' grades could have obscured any potential associations between activity engagement and scholastic performance. Future research should attempt to examine the potential relationship between engagement and grades in a variety of populations (e.g., high school students, non-university youth, university youth in the same program) in order to understand fully the associations between the two.

Additionally, it appears that, among youth in the current study, activity engagement may not relate to the personality system (conceptualized as increased value on social connections and measured by the SPPA importance of close friends and the social interest scale), as was expected. This finding was not entirely clear, as previous literature has demonstrated that activity

engagement should increase youth's value for social connections and relationships (Feldman & Matjasko, 2005; Rose-Krasnor, 2009). Moreover, results within the current study demonstrated that activity engagement may be positively related to adaptive social behaviours, which is a similar construct to having increased value for social connections. The reasoning for the lack of association between activity engagement and the two variables selected to represent the personality system may be due to differences within the university population. As previously mentioned, it has been found that university is a time with many social transitions and adjustments for youth, such as highly fluctuating friendship groups and having to make new connections beyond high school friends (Pittman & Richmond, 2008). Due to the fluctuating social adjustment patterns exhibited by some university students, the results may have been influenced by certain students experiencing negative social adjustment in university, and such responses may have obscured the potential relationship between activity engagement and their value for social connections. In future research, investigators should attempt to examine the potential relationship between engagement and value on social connections in a variety of populations (e.g., high school students, non-university youth, youth demonstrating the same social adjustment in university) in order to fully understand the associations between the two.

Mediators and Risk-Taking. The mediators do seem to somewhat help explain the relationships between activity engagement and youth risk-taking. The results of the final models for each mediation analysis are discussed in turn below.

Adaptive Physical Health Risk-Taking. As previously mentioned there was a significant relationship between behavioural engagement and adaptive physical health risk-taking. In model 3 of mediation analysis, the impact of behavioural engagement on adaptive physical health risk behaviours was no longer significant when the mediator variables were taken into consideration. However, bootstrapping analyses revealed that this was not a significant mediation effect, which

was in contrast to what was hypothesized. Overall, it appears that the potential relationship between activity engagement and youth's frequency of adaptive physical health risk-taking was not explained by school performance (behaviour system), value for social connections (personality system) or exposure to positive peers (perceived environment system), as was expected. However, given that previous research has demonstrated that some university students may be exposed to several extraneous variables that may impact the selected mediator variables, such as a selective drops in grades among certain students and differing social adjustment patterns between students (Kokkelenberg et al., 2006; Martinello et al., 2008; Pittman & Richmond, 2008), it is conceivable that the contradictory findings may be a result of these variables obscuring the potential associations. This, coupled with the fact that behavioural engagement was no longer significantly related to adaptive physical health risk-taking, once the mediators were included in the model, does seem to indicate that there may be an indirect association that should be examined further with various mediators and populations examined. For example, future researchers should attempt to work with youth populations who are experiencing the same academic demands (e.g., university students in the same program) or the same social settings (e.g., university students living in the same residence). Additionally, there are various potential mediators that researchers should consider such as religion and parental involvement. Potential future mediators are discussed further in a later section.

Maladaptive Physical Health Risk-Taking. As mentioned above, results demonstrated there was a significant negative relationship between behavioural engagement and maladaptive physical health risk-taking. The results of the mediation analysis revealed that behavioural engagement was no longer significantly associated with this risk behaviour when the mediator variables were included in the model, which demonstrated that there may have been an indirect effect of the mediators on maladaptive physical health risk-taking. However, bootstrapping

analyses revealed that this was not a significant effect, which was in contrast to what was hypothesized. Overall, it appears that youth who are involved in behavioural activities may participate in less maladaptive physical health risks due to the positive influence that the activities have on their lives, but this association is not explained by scholastic performance, value for social connections or exposure to positive peers, as was expected. As abovementioned, there are several extraneous variables unique to a sample of university students that may have concealed the potential indirect relationship between the mediators and adaptive physical health risk-taking. Taking these possible variables into consideration, along with the fact that behavioural engagement was no longer a significant contributor to the frequency of maladaptive physical health risks once the mediators were included, seems to indicate that there may be an indirect association that should be investigated further with variables such as certain students receiving lower grades than usual due to influences from the university environment (e.g., program demands) taken into consideration and other potential mediators (e.g., religiosity and parental involvement) included.

Adaptive Social Risk-Taking. The association between youth activity engagement and frequency of risk behaviours was strongest for adaptive social risk-taking. The results of the mediation analysis revealed that the relationship between engagement and this risk behaviour lessened, but remained significant, when the mediator variables were included in the model. This result demonstrated that there was some indirect association between the mediators and adaptive social risk-taking; however a bootstrapping analysis revealed that this was not a significant effect, which was in contrast to what was hypothesized. Overall, it appears that youth who were involved in activities participated more frequently in adaptive social risks, due to the positive social forces and environments that the activities may have provided for them, but this association could not be significantly explained by scholastic performance, value for social

connections or exposure to positive peers, as was expected. As previously mentioned, a potential reason for the lack of significance in the mediation analysis could be the fact that this study utilized a unique sample, consisting only of university students. Such a sample may have been impacted by potential third variables such as a natural drop in grades among certain university students and selectively shifting social environments upon entering university. Taking these prospective extraneous variables into account, it is plausible to suggest that there may be an indirect relationship between the mediators and adaptive social risk-taking that was obscured by outside variables. Further research should investigate this possibility, as well as consider other potential mediating variables. Possible mediator variables for future studies are discussed in a later section.

Maladaptive Social Risk-Taking. There was no association between youth activity engagement and maladaptive social risk-taking; thus there was no direct relationship to mediate. However, the full mediation analysis was carried out in order to ensure that the analytic procedures proposed were carried out in their entirety. In accordance with my expectation, it was found that there was no significant meditational effect from the RBT systems on the relationship between activity engagement and maladaptive social risk-taking. It was hypothesized that there would be a significant direct effect and that the RBT variables would significantly mediate it. However, the results were in direct contrast to this expectation. Various reasons have been put forth in previous sections as to why there was no direct effect to mediate but, overall, it appears that youth, even those who are not engaged, do not participate in maladaptive social risks at a high frequency. Thus, there may have been no way for the mediator variables to relate to a direct association that did not exist. Future researchers should aim to deepen the understanding of maladaptive social risk behaviours and attempt to collect data from populations with various frequencies of engagement in this risk behaviour. For example, studies should be conducted on

youth who have been identified as having high frequency of involvement in peer aggression, a behaviour that would be classified as a maladaptive social risk. Such work may help to shed light on the potential relationship that engagement may have with maladaptive social risks in populations where there is a high degree of participation in these behaviours.

Potential Future Mediators. As previously mentioned, the RBT mediators utilized in the current study may have been impacted by extraneous variables (e.g., natural drop in grades and changing social environments in university), which may have obscured the true relationships between the mediators, activity engagement and risk-taking behaviours. Even though the mediators and activity engagement together accounted for a relatively large portion of the variance in risk-taking behaviours (see Model 3 of Tables 5, 6, 7, and 8), there was still a great deal of unaccounted variance. As such, other potential mediators should be considered, as there are numerous other RBT system variables that could further explain the relationship between activity engagement and risk-taking and only a select few RBT variables were represented within this study. For example, religion, spirituality and religiosity are representative of some of the systems in RBT. Religiosity, as operationalized as church attendance corresponds to the behaviour system, positive models for religiosity and spirituality (belief in God or a higher power), correspond to the perceived environment system and spirituality corresponds to the personality system (Donovan & Jessor, 1978, 1985; Jessor, Chase & Donovan, 1980; Jessor, Donovan & Widmer, 1980; Jessor & Jessor, 1977). Such potential mediators also may relate to activity engagement, as those who attend church regularly may hypothetically be exposed to environments where there are a great deal of opportunities to get involved (e.g., church groups, Sunday school). Additionally, religiosity and spirituality may also serve as significant contributors to the variance in risk-taking behaviours, as they may be related to health and social outcomes. Good and Willoughby (2006) found that religiosity, as operationalized as church

attendance, may be related to lower health risk behaviours regardless of spirituality (belief in God or a higher power). Additionally, it was found that those who attended church and believed in God or a higher power demonstrated the most positive adjustment patterns (Good & Willoughby, 2006). In future research, investigators should attempt to incorporate various other potential mediators, such as religious variables, within the current study's framework, in order to include other variables that may aide in explaining the relationship between youth risk-taking and activity engagements.

Beyond spirituality and religiosity there are several other variables that may be good candidates for mediators in studies implementing a similar framework. For example, variables such as sedentary behaviour, attention to healthy living standards (e.g. diet) and sleeping habits all correspond to the behaviour system (Costa, Jessor & Donovan, 1989). Variables such as value for independence, self-rated health status and attitudinal intolerance for deviance correspond to the personality system (Costa et al., 1989). Finally, variables such as parental approval of risk behaviours, paternal modeling of behaviour, and maternal modeling of behaviour all correspond to the perceived environment system (Costa et al., 1989). Each of these potential mediators have been related to outcome risk-taking behaviours among youth (Costa et al., 1989). Such potential mediating variables also may be related to activity engagement, but future studies should aim to include these various representations of the systems within RBT in order to fully understand how the RBT framework may be used to explain the relationship between activity engagement and risk-taking.

Summary of Mediation. Taken together the results of the mediation analyses demonstrated that, for various reasons, the variables selected to represent the RBT systems did not significantly mediate the relationships between activity engagement and youth risk-taking, which was contradictory to what was expected. These results were taken to demonstrate that the

relationship between activity engagement and youth risk-taking frequencies in the current study cannot be significantly explained through their current school performance, positive peer networks or value on social connections. Upon further research it seems that the youth in the current study may have been impacted by extraneous variables, such as their changing social environments in university, which may have obscured the effects of the mediators on their risk-taking frequencies. Further research is required in order to disentangle the true relationship between the selected mediators, activity engagement and risk-taking. Additionally, even though the mediator models accounted for a large portion of the variance in risk-taking behaviours, there was still a great deal of variance that was left unaccounted for.[4] Thus, other potential mediators from the RBT systems should be considered for future studies utilizing a similar framework. One potential area for mediators to arise from is religiosity and spirituality, as these constructs correspond to systems within RBT and hypothetically would also relate to both activity engagement and risk-taking behaviours.

Strengths and Implications

The current study has several notable strengths that should be given attention. First, this study was one of the first to examine whether activity engagement was related to lower maladaptive risks and higher adaptive risks in adolescence and early adulthood (Baumrind, 1987; Byrnes, 1998; Garon & Moore, 2004; Halpern-Felsher & Cauffman, 2001; Irwin & Millstein, 1986; Mann et al., 1989; Steinberg & Scott, 2003; Steinberg, 2004). Additionally, until this

[4] It is important to note that recent researchers have found that social desirability may be highly correlated with self-regulation and including it as a covariate in studies addressing related behaviours (e.g., risk-taking) may actually partial out variability that should be kept in for the main models of the analyses (see Uziel, 2010). As such, it is possible that in the current study including social desirability as a covariate eliminated variability that could be relevantly applied to risk-taking behaviours and thus resulted in the lack of significant findings. Future researchers may want to test similar models with and without social desirability included as a covariate to assess the potential impact of this variable on results.

study, Jessor's PBT had not yet been linked to activity engagement in such a manner. As such, this study provides novel insight into potential relationships with risk-taking in adolescence and emerging adulthood, a topic that has generated a great deal of research and interest within the literature (Boyer, 2006). Moreover, it offers support and direction for future research into the investigation of the possible associations between activity engagement and youth risk behaviours. Although mediation was not found, there were significant direct relationships between youth activity involvement and risk-taking frequencies. Taken together, these results provide a framework for future research attempting to investigate the interesting linkages between activity engagement and risk-taking.

Second, this study took risk-taking research a step further than is commonly seen, through examination of the different categorizations of risk behaviours (e.g., adaptive versus maladaptive). The current study did not only focus on furthering the understanding of maladaptive risk behaviours, but also on adaptive risks. This is an important way to conceptualize youth risk behaviours as much of the literature speaks to the fact that youth are naturally inclined to take risks. Research that only focuses on ways to decrease maladaptive risk behaviours does not aide understanding of how we also can encourage youth to partake in risks in an adaptive manner, as should be emphasized for successful and positive development (Byrnes et al., 1999).

Additionally, few researchers have attempted to provide support for both the different dimensions and types of risk-taking behaviours. Thus, this study was one of the first to do so in such a manner and emphasizes the need to investigate the separate divisions within risk-taking behaviours. This is a very important contribution to the literature, as it demonstrates that adaptive risks behaviours may exist separately from maladaptive behaviours and can be measured and encouraged as such. Overall, the current study contributes to the general knowledge of how risk-

taking may be separated into its meaningful component behaviours. In general it is accepted that risk-taking is multidimensional and is made up of several types of risk behaviours, and yet most studies focus on maladaptive health risk-taking, without considering how other types and dimensions of risk behaviours may function in the world. This study can provide a possible taxonomy for researchers to use when expanding the knowledge of risk behaviours in general and present future directions for investigations focused on expanding the knowledge base of all risk-taking types and dimensions. The current study also may serve as part of the foundation for research to investigate how youth can incorporate adaptive risk behaviours into their daily lives.

Third, in this study I was able to uncover specific associations between activity engagement and youth risk-taking. In general this will contribute to the knowledge of activity engagement and serve to aid future research focused on investigating how activities may play a role in risk-taking. Moreover, one of the most powerful findings was that the two aspects of activity engagement are differentially associated with types of risk behaviours. These specific associations have implications for applied work settings. For example, the current study has demonstrated that programmers in the public health and/or private sector (e.g., non-government organizations) focusing on physical health risk-taking may be best able to target such behaviours through emphasizing behavioural engagement and if he or she are focusing on social risk-taking, then emphasizing psychological engagement may be a good route to work with that specific type of behaviour. Moreover, if a specific programmer is aiming to target youth risk-taking in general, then this study indicates that it may be important to ensure that youth are engaged *both* psychologically and behaviourally.

Fourth, I found that engagement, specifically psychological engagement, was positively related to adaptive social risk frequencies, which is a behaviour that is found to be decreased among depressed people (Allen & Badcock, 2003). Is has been found that diminished

involvement in social risks may increase symptoms of depression or vice versa (Allen & Badcock, 2003). Various aspects of depression, such as lowered perceived social value and increased social burden on others, have also been linked to lowered social risk-taking (Allen & Badcock, 2003). The decline in social risk-taking that depressed individuals may experience has been related to depressed states, with lowered social risks leading to outcomes such as a hypersensitivity to social threat and social exclusion from others (Allen & Badcock, 2003). Thus, the current study may serve to demonstrate a potential research venue for those who work with people who have depression and wish to increase their adaptive social behaviours. For example, researchers may want to investigate how specific activity engagement programs/interventions may relate to adaptive social risk frequencies among depressed individuals. Such relationships are extremely tentative, but do warrant further investigation.

Fifth, the current research came from a robust sample, which can be reexamined for various connections between activity engagement and risk-taking behaviours in future studies. Additionally, various other measures (e.g., shyness scales) were also collected from participants. Thus, other potential mediator variables could emerge from the collected data upon further investigation.

Sixth, the participants in the study were comprised of a representative sample of university students. Since adolescence extends until the age of 25, information from this sample can provide important information about this age-range.

Last, in accordance with recommendations from reputable researchers (e.g., MacKinnon et al., 2002; MacKinnon et al., 2004; MacKinnon et al., 2007; McCartney et al., 2006; Preacher & Hayes, 2004), bootstrapping was used to estimate the significance of the indirect effect of the mediators on outcome risk-taking. This was done because the sample size was smaller than recommended in order to do a Sobel test (i.e. $N > 400$). Thus, it was a statistically sound decision

to employ a test for the significance of the indirect effect that did not rely on an underlying assumption of normality, such as bootstrapping.

Limitations and Future Directions

There are also several limitations to the current study. First, the model proposed was longitudinal in nature and yet it was analyzed using concurrent data. However, this model had yet to be tested in research, thus the current study has served as a model-testing phase in order to provide support for further research (e.g., a longitudinal study of activity engagement and risk-taking). Future research should focus on understanding the development of risk-taking as it relates to activity engagement and should attempt to investigate how these associations change and develop over time. With such research it may become clear whether activity engagement is associated with increases and/or decreases in specific risk behaviours. Longitudinal replications of the current study would aid in understanding how risk-taking, as related to activity engagement, develops and changes over time. Such studies would allow for further understanding of the present relationships, as well as any age-related changes in activity engagement, the RBT systems and the various risk-taking behaviours. In addition to the need for longitudinal studies, future researchers should also aim to conduct experimental studies on youth risk-taking, such as exposing youth to hypothetical adaptive and maladaptive risky situations and observing their behaviours. Such work may serve to further the understanding of how risk-taking behaviours are exhibited by youth in a variety of settings and when youth are exposed to a variety of engagement activities.

Second, there was a chance for bidirectionality within the model. Although evidence did not support the reverse model (i.e., the RBT systems did not mediate the effect of risk-taking on activity engagement), the possible existence of additional models that could theoretically explain the associations between activity engagement, risk-taking and the mediators cannot be denied.

For example, it is plausible that youth activity engagement could partially mediate the relationships among school performance (behaviour system), value for social connections (personality system), exposure to positive peers (perceived environment system) and risk-taking frequencies. Given that this study was the first to demonstrate a connection between activity engagement and the various categorizations of risk-taking behaviours, future investigators should aim to examine the potential directional effects using longitudinal designs.

Third, the data used did not have an equal representation of males and females (89% were female) and there were too few males to allow for an analysis of the potential moderating effect of gender. Thus, it is possible that the results of the current study only represent effects that may exist among undergraduate females, as the smaller sample size of males made it difficult to find effects that could be applied confidently to the male population[5]. A great deal of research has demonstrated that males and females engage in risk-taking at different frequencies and for differing reasons (e.g., Byrnes et al., 1999, Coppens & Gentry, 1991; Ginsburg & Miller, 1982; Rosen & Peterson, 1990). Thus, it was probable that the relationship between activity engagement, the mediators and risk-taking would have been different for males as compared to females. Future investigators should attempt to replicate the current study within a sample representative of both males and females, in order to assess any possible relationship between various risk behaviours and gender.

Fourth, the different categorizations of risk behaviours may function differently in various populations and contexts. As such, the behaviours that have been identified as maladaptive behaviours in the current study may function as healthy/adaptive behaviours in certain

[5] It is important to note that supplemental analyses conducted separately on males and females revealed that the results did speak to the female population more than the male population. As such, replications of the present study should include a larger and more representative sample of males and females in order to better comment on how the proposed model may apply to both genders.

populations, such as extremely troubled youth. Research has indicated that some risk behaviours commonly regarded as maladaptive may be normative (Willoughby et al., 2007) or offer benefits and opportunities to certain youth who are not receiving benefits from other aspects of their lives (Ungar, 2002). Additionally, the conceptualization of certain risks as being adaptive and maladaptive may not translate across cultures, as research has shown that some cultures demonstrate different patterns of risk-taking than others. Such cultural differences in risk-taking have been attributed to a wide variety of reasons, such as socioeconomic status (Khallad, 2010), differing societal norms (Khallad, 2010; Kim & Park, 2010) and cultural differences in risk appraisals (Kim & Park, 2010).

Furthermore, there are some potential gender differences in the conceptualization of risk behaviours as maladaptive or adaptive that were not addressed in the current study. It is possible that certain genders may perceive specific maladaptive risks, such as excessive drinking, as normative in certain environments. Finally, there may be gender differences among the perceptions of the types of risk behaviours as well. What might be commonly regarded as a physical health risk for males (e.g., drinking) may be more of a social risk for females. Future researchers should remain cognizant of the similarities and possible differences that may exist between the different risk-taking categorizations in various populations. Such work may demonstrate how specific aspects of risk-taking function between and within various populations and help to deepening the understanding of how risk behaviours function for specific groups.

Fifth, other models beyond Jessor's PBT should be considered as potential significant frameworks for the proposed meditational associations. Although the selected model has been extensively connected to youth risk-taking behaviours, there are several other potentially relevant models. For example, the Theory of Triadic Influence describes a framework for risk-taking based on distal, proximal and ultimate causes of behaviour (Flay & Petraitis, 1994). Various

streams of influence, such as cultural, social and interpersonal forces, are thought to relate to the three main causes of behaviour. Future investigators should consider other such possible conceptual frameworks when examining the associations between activity engagement and risk-taking; such work will allow for the inclusion of a variety of potential mediators and will expand the knowledge of risk-taking and engagement in general.

Sixth, my research has not provided a full assessment of all types of risk-taking. Indeed, there are many more risk-taking behaviours beyond health and social, such as ethical and financial risk-taking (Jackson et al., 1971). Additionally, it has not provided a comprehensive examination of all aspects of youth engagement. As previously mentioned, engagement encompasses various activities and the current study has not targeted any specific types of engagement (e.g. sports, arts, social activism) or patterns of activities, which may have distinct relationships to outcome risk behaviours. As previously mentioned, specific types of activity engagement, such as sports or outdoor adventure programs like Outward Bound, may have different associations with risk-taking behaviours than other forms of activity engagement (e.g., Feldman & Matjasko, 2005; Garry & Morrissey, 2000; Moore & Werch, 2003; Tao et al., 2007). Specifically, my results have suggested that sport involvement may be related to decreased adaptive physical health risk behaviours. As mentioned previously, this may be due to differences in sport activities as compared to other activities (e.g., youth groups, volunteering). Additionally, not all individual difference variables that are associated with experiences in activities were included in the current study. Specifically, individual variables such as parental support and involvement have been found to impact the nature of adolescents' experiences in activities (Rose-Krasnor, 2009). Future researchers should attempt to investigate the specific role of various types of engagement on youth risk-taking behaviours and how certain individual variables may

contribute to these associations. Such studies would allow for further examination of how specific aspects of activity engagement may relate to outcome risk-taking frequencies.

Seventh, there may be some limitations regarding the sample used within the current study. As abovementioned, risk-taking tends to increase from the ages of 14 years to the mid-to-late twenties (Steinberg, 2007) Thus, the selected sample of university students who were between the ages of 18 and 25 years included only a small sector of this age range and contained no members of the younger population. A future study should expand the research to be inclusive of the entire adolescent age range. Additionally, my sample represented only university students and, as previously mentioned, this sample may have been impacted by extraneous variables unique to the university experience, such as certain students experiencing drops in grades or fluctuating social adjustment patterns (Kokkelenberg et al., 2006; Martinello et al., 2008; Pittman & Richmond, 2008). It is possible that these variables specific to university students obscured the results. Researchers should therefore attempt to replicate the current study using other youth populations, including a non-university sample.

Finally, the selected measures also have a few limitations. First, they consisted only of self-report data, which meant that one could not be sure that the information presented was representative of the participants' actual behaviour when placed in a real-life risk decision. A more comprehensive study should include ratings from other influential people in adolescents' and emerging adults' lives (e.g., peers, parents, role models), as well as physiological measurement of the participants' responses to risky situations. This could be accomplished through presenting participants with real life videos of risk-taking and asking them what they would do, while also recording physiological data (e.g. galvanic skin response). Physiological reactions to risky situations have been found to reliable predictors of risk behaviours (Boyer, 2006) and combining such data with self-reported risk-taking frequencies may provide a more

robust understanding of youth risk-taking behaviours. Additionally, the measures only gauged "cold cognition". This means that within the study environment, participants do not always responds to situations in a manner reflective of how they would behave in "real life" scenarios if emotions are aroused (Boyer, 2006). However, Hoffrage, Weber, Hertwig and Chase (2003) demonstrated that those who indicate they prefer risks in the lab, tend to prefer risks in "real life" scenarios as well. Even though social desirability was partialled out in the current study, using physiological data along with self-report data (while partialling out social desirability) may provide a more robust investigation of how often and why youth engage in a variety of risk behaviours. Additionally, several variables, namely social interest score, SPPA importance of close friends, behavioural engagement, and social desirability, had low internal reliability, which may have underestimated the effects in the mediation models.

Conclusion

The present study contributes to existing literature on youth activity engagement and risk-taking behaviours by identifying a potential framework to investigate youth risk-taking trajectories and a manner that may help explain frequencies of risks among youth. Previous risk-taking research has focused mainly on maladaptive risk behaviours; however this study indicates that there are other dimensions and types of risk-taking that youth can and do engage in. Additionally, the current study associates certain risk-taking frequencies to adolescents' levels of activity engagement (e.g., behavioural engagement relates negatively to maladaptive physical health risks and psychological engagement relates positively to adaptive social risks). The associations between engagement and risk-taking behaviours were not explained by current school performance (behaviour system), value for social connections (personality system) or exposure to positive peers (perceived environment system), as had been expected. Overall, in the present study youth risk-taking frequencies for adaptive social behaviours were significantly

attributed to their level of engagement in activities. However, further research is needed to understand how and why these associations exist.

Collectively, these findings indicate that researchers should attempt to study various categorizations of risk behaviours, in attempts to understand more than just maladaptive risks in adolescence and emerging adulthood. Such work will expand the knowledge of risk-taking in general and possibly demonstrate ways in which youth can successfully engage in risks. Additionally, intervention programmers should consider youth engagement as an important aspect to include in programs focusing adolescent risk-taking trajectories. Finally, the results demonstrate that activity engagement relates to increased adaptive social risk-taking, a behaviour that is generally decreased among depressed individuals, which indicates clinical researchers interested in depression may want to investigate this association further as an area of interest.

Future research should build on these findings by examining how specific types of engagement activities (e.g., only sports or only community groups) relate to various risk-taking trajectories. Moreover, studies should be conducted on how the various types and dimensions of risk behaviours may differ between genders and cultures. The correlations in the current study seem to indicate that males and females differentially engage in the risks examined, but there was not enough gender variance in the sample to examine this potential connection further. Additionally, other potential mediators, such as religiosity, should be considered and examined in a framework similar to the current study. A variety of youth populations should be examined longitudinally, in order to fully understand which mediators are significant and how the relationship between activity engagement and various risk-taking behaviours develops across the lifespan. Such investigations may shed light on both the adaptive and maladaptive aspects to adolescent risk-taking and provide more clarity on the positive relationship that activity engagement may have with adolescents' developmental trajectories.

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Appendix A - REB Clearance

Brock University
Research Ethics Board
Tel: 905-688-5550 ext. 3035
Email: reb@brocku.ca

Certificate of Ethics Clearance for Human Participant Research

DATE:	1/20/2011		
PRINCIPAL INVESTIGATOR:	ROSE-KRASNOR, Linda - Psychology		
FILE:	10-150 - ROSE-KRASNOR		
TYPE:	Masters Thesis/Project	STUDENT:	Jayne Morrish
		SUPERVISOR:	Linda Rose-Krasnor

TITLE: The relationship between youth risk-taking behaviours and activity engagement

ETHICS CLEARANCE GRANTED

Type of Clearance: NEW Expiry Date: 1/31/2012

The Brock University Research Ethics Board has reviewed the above named research proposal and considers the procedures, as described by the applicant, to conform to the University's ethical standards and the Tri-Council Policy Statement. Clearance granted from **1/20/2011 to 1/31/2012.**

The Tri-Council Policy Statement requires that ongoing research be monitored by, at a minimum, an annual report. Should your project extend beyond the expiry date, you are required to submit a Renewal form before **1/31/2012**. Continued clearance is contingent on timely submission of reports.

To comply with the Tri-Council Policy Statement, you must also submit a final report upon completion of your project. All report forms can be found on the Research Ethics web page.

In addition, throughout your research, you must report promptly to the REB:

a) Changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
b) All adverse and/or unanticipated experiences or events that may have real or potential unfavourable implications for participants;
c) New information that may adversely affect the safety of the participants or the conduct of the study;
d) Any changes in your source of funding or new funding to a previously unfunded project.

We wish you success with your research.

Approved: Michelle K. McG

Michelle McGinn, Chair
Research Ethics Board (REB)

Note: Brock University is accountable for the research carried out in its own jurisdiction or under its auspices and may refuse certain research even though the REB has found it ethically acceptable.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and clearance of those facilities or institutions are obtained and filed with the REB prior to the initiation of research at that site.

Appendix B – Risk-Taking Inventory-Modified

PART A	***In the LAST 12 MONTHS, how often have you done the following?***

	NEVER	RARELY	SOMETIMES	OFTEN
1. Stole money from parents/roommates				
2. Helped someone out even when you did not have the time				
3. Destroyed other people's property (i.e., vandalism, graffiti, smashed mailbox, etc)…				
4. Operated a vehicle while impaired (buzzed/drunk; high)				
5. Been the passenger in a vehicle with a driver who was impaired				
6. Engaged in sexual activity without a condom				
7. Wore a seatbelt while being a passenger in a car				
8. Swore at someone and called them names				
9. Excluded someone				
10. Encouraged others to partake in group settings				
11. Spread rumours and untrue stories				
12. Kicked and hit someone				
13. Used hash, marijuana (weed, joint)				
14. Dared another individual to hurt someone				
15. Told your friends to stop hanging around someone				
16. Worn the proper protection while playing sports				
17. Attempted to make new friends in various social groups				
18. Stolen something from a store (shoplifted)				
19. Behaved in a certain way to protect your popularity				
20. Behaved in a certain way as to not annoy others				
21. Told your friends to stop hanging around someone because you knew they were a bad influence				
22. Attempted to make friends even though you thought you might not be accepted				
23. Taken precaution when using sharp objects				

		NEVER	RARELY	SOMETIMES	OFTEN
24.	Used other illegal drugs (.e.g., Cocaine/Crack, Ecstasy, Crystal meth, Magic mushrooms)				
25.	Contributed/donated to any charities, even if you don't have a lot of money				
26.	Went out of your way to meet new people				
27.	Teased and ridiculed someone				
28.	Helped others with projects, even if you were not sure about the subject				
29.	Made an effort to connect to other people				
30.	Wrote hurtful notes to someone in person/online/cellphone				
31.	Drank more than is healthy for you				
32.	Taken the proper precautions when using electricity (e.g., working with it, using electrical objects in the bathroom)				
33.	Avoided a possible violent situation				
34.	Smoked a cigarette				
35.	Refused to speak up because you thought it might impact people's perception of you				
36.	Taken the proper precautions while near heights				
37.	Used legal prescription drugs that were not prescribed for you (e.g., painkillers such as Percocet, Tylenol 3)				
38.	Ensured that you have a way home after drinking				
39.	Worn a seatbelt while driving				
40.	Pushed and shoved someone				
41.	Refused rides home from people who are impaired				

PART B ***In the past 12 MONTHS, how often did you use the following substances or engage in the following behaviours?***

	NEVER	ONCE	A FEW TIMES A YEAR	A FEW TIMES A MONTH	FEW TIMES A WEEK	EVERY DAY
Used hash, marijuana (weed, joint)						
Used other illegal drugs (.e.g., Cocaine/Crack, Ecstasy, Crystal meth, Magic mushrooms)						

Used legal prescription drugs that were not prescribed for you (e.g., painkillers such as Percocet, Tylenol 3)

If other drugs, which ones?

PART C ***Check the option that best describes you***

1. **How often do you go drinking or have a drink?**
   O Never O less than once a month O 1-3 times a month O Once a week
   O 2 times a week O 3-4 times a week O 5-6 times a week O Every day

2. **On average, when you are drinking alcohol, about how many drinks do you have?**
   O Less than 1 drink O 1 drink O 2-3 drinks
   O 4-6 drinks O 7-10 drinks O Over 10 drinks

3. **Have you EVER smoked a full cigarette?** O Yes O No

4. **How many cigarettes do you usually smoke EACH DAY?**
   O I no longer smoke O I don't smoke everyday O One O Less than 5
   O 6-10 O 11-16 O About a pack O More than a pack

Appendix C- Activity Engagement Measure

This survey is about youth engagement. Here is what we think "youth engagement" means:

> *Youth engagement is the meaningful participation and continuing involvement of a young person in an activity, which has a focus outside of him or herself.*

We think youth engagement has four parts:

1. HEAD ~ thinking, such as learning about the activity, and
2. HEART ~ feelings, for example, having fun doing the activity,
3. FEET ~ spending time doing the activity, and
4. SPIRIT ~ meaningfulness and connection to other people or a higher power when you are doing the activity.

We believe that there are lots of ways youth can be engaged. Engagement could come from spending time with friends and family, playing music in a band, being on a sports team, volunteering in the community, and lots of other ways. Pick an activity that you do that is meaningful to you, that you've been doing for a while, and that connects you to other people. If you don't do an activity that is all of those things, pick one that is closest. Please think about this activity when you answer the questions below. There are no right and wrong answers!

OR

If you are doing this survey for an organization or group, please answer the questions based on what you do in the organization or group.

Please write the FULL NAME of the activity (not just the initials): *Please tell us a little about what YOU do in this activity:*

Please rank the following activities from 1 to 3, with 1 being most important to you and 3 being least

Activity	**Rank**
Sports	
Music	
School/Academic	

For the next two statements, please circle ALL of the answers that fit your activity.

Where do you usually do this activity?	At my home	At my school	Other place (where?): _____	
Whom do you usually do it with?	By myself	Other youth	Adults	Other (whom?): _____

The next three questions are about the FEET part of your engagement. Please circle ONE answer for each question.

How often do you do this activity?	Done it just once	Few times a year	Every month	Few times a month	Once a week	Several days a week
How long have you been doing it?	Just started doing it	1 to 5 months	6 months to 1 year	2 to 3 years	4 to 5 years	More than 5 years
How much longer do you think will you stay involved?	Less than 1 more month	1 to 5 more months	6 months to 1 year	2 to 3 more years	4 to 5 more years	More than 5 more years

Now we would like to learn about the HEAD, HEART, and SPIRIT parts of your engagement. Please choose ONE answer that best matches your opinion for each statement below.

About the HEAD part of your engagement:

1. I really focus on this activity when I'm doing it.	Not at all	Little bit	Somewhat	Quite a bit	A lot
2. I am interested in learning more about this activity.	Not at all	Little bit	Somewhat	Quite a bit	A lot
3. I lose track of time when I'm doing this activity.	Not at all	Little bit	Somewhat	Quite a bit	A lot

About the HEART part of your engagement:

4. I enjoy doing this activity.	Not at all	Little bit	Somewhat	Quite a bit	A lot
5. This activity is an important part of who I am.	Not at all	Little bit	Somewhat	Quite a bit	A lot
6. It would be very hard for me to give up this activity.	Not at all	Little bit	Somewhat	Quite a bit	A lot

About the SPIRIT part of your engagement:

7. This activity helps give my life meaning.	Not at all	Little bit	Somewhat	Quite a bit	A lot
8. This activity connects me to other people.	Not at all	Little bit	Somewhat	Quite a bit	A lot
9. This activity helps me connect to something greater than myself.	Not at all	Little bit	Somewhat	Quite a bit	A lot
10. I help other people when I do this activity.	Not at all	Little bit	Somewhat	Quite a bit	A lot
11. Overall, I think this activity is very engaging.	Strongly agree	Agree	Neutral	Disagree	Strongly disagree

Appendix D- Harter SPPA

General Instructions

On these questionnaires you are going to fill out, we want to know what you really think about each question;
so answer as honestly as possible. There are no right or wrong answers. All information will be kept private and confidential, which means that your name will not be on any of the forms, and nobody will know
how you answered any of the questions. Read carefully and try to answer every question.
.

Directions for the "What I'm Like" Questionnaire

On this questionnaire, we are going to ask you to mark the box that describes you the best. The following
are step-by-step instructions for how to answer every question.

1. Look at the two statements in the example:
"Some youth like to go to movies." or "Other youth prefer sports events."

2. Decide which statement is more like you.
Are you the type of person who would rather go to movies, **OR** do you prefer sports events?

3. After you choose one of the two statements (either the one on the left side or the one on the right side), you should decide how true the statement is for you.
Is the statement "Sort of True" for you **OR** "Really True" for you.

4. Mark the box that you think best fits you.

Only select ONE answer. You should have only *ONE* box checked for each number.

Remember this is not a test; just choose which statement is like you most of the time.

Example

(a)	**Really True for me**	**Sort of True for me**			**Sort of True for me**	**Really True for me**
	O	O	Some youth like to go to movies.	**BUT**	Other youth prefer sports events.	O	O

1.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**	
	O	O	Some youth feel that they are just as smart as others their age	**BUT**	Other youth are not so sure and wonder if they are as smart.	O	O	
2.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**	
	O	O	Some youth find it hard to make friends	**BUT**	For other youth it is pretty easy.	O	O	
3.	**Really** True **for me**	**Sort of** True **for me**				**Sort of** True **for me**	**Really** True **for me**	
	O	O	Some youth are not happy with the way they look	**BUT**	Other youth are happy with the way they look.	O	O	
4.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**	
	O	O	Some youth usually do the right thing	**BUT**	Other youth often do not do what they know is right.	O	O	

5.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth are able to make really close friends	**BUT**	Other youth find it hard to make really close friends	O	O
6.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth are often disappointed with themselves	**BUT**	Other youth are pretty pleased with themselves.	O	O
7.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth are pretty slow in finishing school work	**BUT**	Other youth can do school work more quickly.	O	O
8.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth have a lot of friends	**BUT**	Other youth do not have very many friends.	O	O
9.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth wish their body was different	**BUT**	Other youth like their body the way it is.	O	O

10.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth often get in trouble for the things they do	**BUT**	Other youth usually do not do things that get them in trouble.	O	O
11.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth have a close friend they can share secrets with	**BUT**	Other youth do not have a close friend they can share secrets with.	O	O
12.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth do not like the way they are leading their life.	**BUT**	Other youth do like the way they are leading their life.	O	O
13.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth do very well on their class work	**BUT**	Other youth do not do very well on their class work.	O	O

14.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth are very hard to like	**BUT**	Other youth are really easy to like.	O	O
15.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth wish their physical appearance was different	**BUT**	Other youth like their physical appearance the way it is.	O	O
16.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth feel really good about the way they act	**BUT**	Other youth do not feel that good about the way they often act.	O	O
17.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth wish they had a really close friend to share things with	**BUT**	Other youth do have a close friend to share things with.	O	O

18.	**Really True for me**	**Sort of True for me**			**Sort of True for me**	**Really True for me**
	O	O	Some youth are happy with themselves most of the time	**BUT**	Other youth are often not happy with themselves.	O O
19.	**Really True for me**	**Sort of True for me**			**Sort of True for me**	**Really True for me**
	O	O	Some youth have trouble figuring out the answers in school	**BUT**	Other youth almost always can figure out the answers.	O O
20.	**Really True for me**	**Sort of True for me**			**Sort of True for me**	**Really True for me**
	O	O	Some youth are popular with others their age	**BUT**	Other youth are not very popular.	O O
21.	**Really True for me**	**Sort of True for me**			**Sort of True for me**	**Really True for me**
	O	O	Some youth think that they are good looking	**BUT**	Other youth think that they are not very good looking.	O O
22.	**Really True for me**	**Sort of True for me**			**Sort of True for me**	**Really True for me**
	O	O	Some youth do things they know they should not do	**BUT**	Other youth hardly ever do things they know they should not do.	O O

23.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth find it hard to make friends they can really trust	**BUT**	Other youth are able to make close friends they can really trust.	O	O
24.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth like the kind of person they are	**BUT**	Other youth often wish they were someone else.	O	O
25.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth feel that they are pretty intelligent	**BUT**	Other youth question whether they are intelligent.	O	O
26.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth feel that they are socially accepted	**BUT**	Other youth wish that more people their age accepted them.	O	O
27.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth really like their looks	**BUT**	Other youth wish they looked different.	O	O

28.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth usually act the way they know they are supposed to	**BUT**	Other youth often do not act the the way they are supposed to.	O	O
29.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth do not have a friend that is close enough to share really personal thoughts with	**BUT**	Other youth do have a friend that they can share personal thoughts and feelings with.	O	O
30.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth are very happy being the way they are	**BUT**	Other youth wish they were different.	O	O

HOW IMPORTANT ARE EACH OF THESE THINGS TO YOU?

1.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth think it <u>is</u> important to be intelligent	**BUT**	Other youth <u>don't</u> think it is important to be intelligent.	O	O
2.	**Really** True **for me**	**Sort of** True **for me**				**Sort of** True **for me**	**Really** True **for me**
	O	O	Some youth <u>don't</u> think it's all that important to have a lot of friends	**BUT**	Other youth think that having a lot of friends <u>is</u> important.	O	O
3.	**Really** True **for me**	**Sort of** True **for me**				**Sort of** True **for me**	**Really** True **for me**
	O	O	Some youth think it is important to be good at sports	**BUT**	Other youth don't care much about being good at sports.	O	O
4.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth don't really think that their physical appearance is all that important	**BUT**	Other youth think that their physical appearance is important.	O	O

HOW IMPORTANT ARE EACH OF THESE THINGS TO YOU?

5.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth don't care that much about how well they do on a paying job	**BUT**	Other youth feel it's important that they do well on a paying job.	O	O
6.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth think it's important that the people they are romantically interested in like them back	**BUT**	Other youth don't really care that much whether someone they are interested in likes them that much.	O	O
7.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth don't think it's that important to do the right thing	**BUT**	Other youth think that doing the right thing is important.	O	O
8.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth think it's important to be able to make really close friends	**BUT**	Other youth don't think making close friends is all that important.	O	O

HOW IMPORTANT ARE EACH OF THESE THINGS TO YOU?

9.	**Really True for me**	**Sort of True for me**				**Sort of True for me**	**Really True for me**
	O	O	Some youth don't think that doing well in school is really that important	**BUT**	Other youth think that doing well in school is important.	O	O
10.	**Really**	**Sort of**				**Sort of**	**Really**
	True **for me**	*True* **for me**				*True* **for me**	*True* **for me**
	O	O	Some youth think it's important to be popular	**BUT**	Other youth don't care that much about whether they are popular.	O	O
11.	**Really**	**Sort of**				**Sort of**	**Really**
	True **for me**	*True* **for me**				*True* **for me**	*True* **for me**
	O	O	Some youth don't think that being athletic is that important	**BUT**	Other youth think that being athletic is important.	O	O
12.	**Really**	**Sort of**				**Sort of**	**Really**
	True **for me**	*True* **for me**				*True* **for me**	*True* **for me**
	O	O	Some youth think that how they look is important	**BUT**	Other youth don't care that much about how they look.	O	O

13.	**Really** *True* **for me**	**Sort of** *True* **for me**				**Sort of** *True* **for me**	**Really** *True* **for me**
	O	O	Some youth think it's important to do their best on a paying job	**BUT**	Other youth don't think that doing their best on a job is all that important.	O	O
14.	**Really** *True* **for me**	**Sort of** *True* **for me**				**Sort of** *True* **for me**	**Really** *True* **for me**
	O	O	Some youth don't care that much whether they are dating someone they are romantically interested in	**BUT**	Other youth think it's important to be dating someone they are interested in.	O	O
15.	**Really** *True* **for me**	**Sort of** *True* **for me**				**Sort of** *True* **for me**	**Really** *True* **for me**
	O	O	Some youth think it's important to act the way they are supposed to	**BUT**	Other youth don't care that much whether they are acting the way they are supposed to.	O	O
16.	**Really** *True* **for me**	**Sort of** *True* **for me**				**Sort of** *True* **for me**	**Really** *True* **for me**
	O	O	Some youth don't care that much about having a close friend they can trust	**BUT**	Other youth think it's important to have a really close friend you can trust.	O	O

Appendix E - Social Interest Scale

Below are a number of pairs of personal characteristics or traits. For each pair, underline the trait which you value more highly. In making each choice, ask yourself which of the traits in that pair you would rather possess as one of *your own* characteristics. For example, the first pair is "imaginative-rational." If you had to make a choice, which would you rather me? Draw a line under your choice in each of the pairs.

Some of the traits will appear twice, but always in combination with a different trait. No pairs will be repeated.

I would rather be…

1. Imaginative – Rational
2. Helpful – Quick-witted
3. Neat – Sympathetic
4. Level-headed – Efficient
5. Intelligent – Considerate
6. Self-reliant – Ambitious
7. Respectful – Original
8. Creative – Sensible
9. Generous – Individualistic
10. Responsible – Original
11. Capable – Tolerant
12. Trustworthy – Wise
13. Neat – Logical
14. Forgiving – Gentle
15. Efficient – Respectful
16. Practical – Self-confident
17. Capable – Independent
18. Alert – Cooperative
19. Imaginative – Helpful
20. Realistic – Moral
21. Considerate – Wise
22. Sympathetic – Individualistic
23. Ambitious – Patient
24. Reasonable – Quick-witted

Appendix F – Perceived Environment Measure

Parental Controls: Higher scores demonstrate greater perceived parental control

	Definitely would not			Definitely would
1. Would your parents be able to influence your behaviour if you were going to do something illegal or that most people would think of as wrong?	1	2	3	4

Friends Controls: Higher scores demonstrate higher perceived friend disapproval

	Definitely would not			Definitely would
2. Would your friends try to influence your behaviour if you were going to do something illegal or that most people would think of as wrong?	1	2	3	4

3. What is the level of approval that your friends would show if you did something that most people would think was wrong?	1 High approval	2	3	4	5	6 High disapproval

Parents vs. Friends Influence: Higher scores indicate greater orientation toward friends than towards parents

	Parents	Friends
4. Do you value your parents' or friends' opinions more when you have a serious personal or career decision to make?	1	2

	Parents	Friends
5. Who has a greater impact on your present outlook on life?	1	2

Friends' Approval of Risk-Taking: Higher scores reflect higher than average degrees of friends' approval for involvement in negative risk-taking.

	Not at all	Little bit	Somewhat	Quite a bit	A lot
6. How often do your friends encourage you to engage in deviant behaviour?			3		
7. How often do your friends influence you to engage in deviant behaviour?			3		
8. How often do your friends pressure you to engage in deviant behaviour?			3		

Friends Models for Negative risks: Higher scores indicate higher than average exposure to friends' involvement with these behaviours.

	Not at all	Little bit	Somewhat	Quite a bit	A lot
9. How often do your friends engage in drinking?	1	2	3	4	5
10. How often do your friends engage in marijuana use?	1	2	3	4	5
11. How often do your friends engage in cigarette smoking?	1	2	3	4	5
12. How often do your friends act out in social settings?	1	2	3	4	5
13. How often do your friends express strong opinions in public, even if it's against popular opinion?	1	2	3	4	5
14. How often do your friends get in fights socially?	1	2	3	4	5
15. How often do your friends speed?	1	2	3	4	5

Friends Models for Religiosity: Higher scores reflect that most of them do

	None of them do	Some of them do	Most of them do
16. Do your friends think of religion as an important part of their own lives	1	2	3

Appendix G – Social Desirability Measure

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is *true* or *false* as it pertains to you personally.

If you agree with a statement or decide that it does describe you, answer TRUE. If you disagree with a statement or feel that it is not descriptive of you, answer FALSE.

Statement	Response
1. Before voting I thoroughly investigate the qualifications of all the candidates.	
2. I never hesitate to go out of my way to help someone in trouble.	
3. It is sometimes hard for me to go on with my work if I am not encouraged.	
4. I have never intensely disliked anyone.	
5. On occasion I have had doubts about my ability to succeed in life.	
6. I sometimes feel resentful when I don't get my way.	
7. I am always careful about my manner of dress.	
8. My table manners at home are as good as when I eat out in a restaurant.	
9. If I could get into a movie without paying and be sure I was not seen I would probably do it.	
10. On a few occasions, I have given up doing something because I thought too little of my ability.	
11. I like to gossip at times.	
12. There have been times when I felt like rebelling against people in authority even though I knew they were right.	
13. No matter who I'm talking to, I'm always a good listener.	
14. I can remember "playing sick" to get out of something.	
15. There have been occasions when I took advantage of someone.	
16. I'm always willing to admit it when I make a mistake.	
17. I always try to practice what I preach.	
18. I don't find it particularly difficult to get along with loud mouthed, obnoxious people.	
19. I sometimes try to get even rather than forgive and forget.	
20. When I don't know something I don't at all mind admitting it.	
21. I am always courteous, even to people who are disagreeable.	

Statement	Response
22. At times I have really insisted on having things my own way.	
23. There have been occasions when I felt like smashing things.	
24. I would never think of letting someone else be punished for my wrongdoings.	
25. I never resent being asked to return a favor.	
26. I have never been irked when people expressed ideas very different from my own.	
27. I never make a long trip without checking the safety of my car.	
28. There have been times when I was quite jealous of the good fortune of others.	
29. I have almost never felt the urge to tell someone off.	
30. I am sometimes irritated by people who ask favors of me.	
31. I have never felt that I was punished without cause.	
32. I sometimes think when people have a misfortune they only got what they deserved.	
33. I have never deliberately said something that hurt someone's feelings.	